The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. VII. No. 177 · NOVEMBER 4, 1922 · Prepaid Annual Subscription United Kingdom, £1.1.0; Abroad, £1.6.0.

Contents

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE *is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders and Postal Orders should be made payable to Benn Brothers, Ltd.*

Editorial and General Offices—8, Bouverie St., London, E.C.4.

Telegrams: "Allangas, Fleet, London." Telephone: City 9852 (6 lines).

The Election and Chemical Industry

ELECTIONS are generally recognised as damaging to trade. All the elections within the memory of the present generation have had the effect of dampening down industrial activity while they lasted. The present contest is, however, from all the evidences that reach us, the exception which proves the rule. The announcement of the dissolution actually gave a fillip to trade, and there is to-day in both wholesale and retail circles a feeling of optimism and cheer which is in every way refreshing. The explanation of this phenomenon is perhaps not difficult to seek. Two or three big clouds have been dispersed since Mr. Bonar Law announced that he would make an immediate appeal to the electorate.

The world of commerce has had the prospect of the disturbance of an election at any time during the next twelve months. We have been told that it might take place before Christmas, or that it would probably be before the Budget, or, again, that it would certainly be held next autumn. Mr. Bonar Law has at least earned our gratitude in this respect, that he has concentrated the disturbance within a period of three weeks and given us a prospect after November 15 of a period of rest.

A return to party government, whatever party it may be, offers the hope of a balance and responsibility in political matters which will reflect itself upon commercial possibilities. But perhaps the most significant event of the last few weeks is the publication of the official Labour programme. For some months past Labour leaders have been showing a tendency to move to the right and a sweet reasonableness which at one time offered to them a real prospect of an early accession to power. At the critical moment, however, they have failed to maintain this high standard of statesmanship, and have issued a programme, including a Capital Levy, which the City seems to think will cost them something like a hundred seats.

A most important aspect of the election situation as affecting British chemical industry is the attitude of our new legislators towards such measures as the Dyestuffs and Safeguarding of Industries Acts. One of the chief planks in the platform of the "Wee Frees" is unqualified Free Trade and the repeal of, among others, the above mentioned Acts. However these measures may be regarded by different interests, all concerned will require from their respective candidates a clear and unequivocal expression of their attitude on these and cognate matters. It would also be of great service to the industry if the value of chemistry to the nation could be brought home to every prospective member. With this purpose in view, the American Chemical Society is preparing a concise statement emphasising the essential nature of a flourishing chemical industry, for presentation to new members entering the Senate or the House of Representatives.

Under the last Government the members of the House of Commons whose Parliamentary interests were intimately bound up with the chemical industry were a very small band, and it is therefore all the more to be regretted that Mr. W. J. U. Woolcock, whose impending retirement was known in well-informed circles some time ago, has definitely decided not to offer himself for re-election. His masterly handling of the forces in support of the Dyestuffs Act was largely responsible for the passage of that measure, and he has rendered equally effective service in many other directions. Often referred to as the "member for chemical industry," Sir William Pearce, who also played a prominent part in the passage of the Dyestuffs Act, and whose work on the Balfour of Burleigh Committee will not soon be forgotten, seeks re-election for the Limehouse Division, which he has represented since 1906. A distinguished new candidate has come forward in the person of Sir John Brunner. His father, at an early stage in his political career, was recognised as a great private member, and later, as a party leader, he was called to the chair, as a matter of course. It is therefore fitting that his work should be continued by his son.

Other candidates include Mr. C. S. Garland, a leading member of the Chemical Engineering Group and the British Association of Chemists, Sir Alfred Mond, Dr. G. C. Clayton, of the United Alkali Co., Ltd., Mr. J. C. Nicholson, of Jenson and Nicholson, Ltd., Sir R. Bird of Alfred Bird and Sons, Ltd., and Major A. G. Church, general secretary of the National Union of Scientific Workers.

In Defence of the Therm

It would seem that to be a gas engineer is not altogether an alluring occupation. Those responsible for the manufacture and distribution of towns gas were for some years subjected to criticism from the high-brows in other fields of technology; they were informed that their methods were antiquated, and that they had failed to move with the times. Now, however, that a serious attempt has been made to put the use and sale of gas on a more scientific and equitable basis, the gas engineer has brought down upon himself a storm of expostulation which would appear to be as unnecessary as it is undeserved. The trouble is, of course, all to do with the "therm"; and the critics, with a delightful disregard for elementary principles which are nothing more or less than common sense, seem to have reached the conclusion that more heat units are required to give a definite duty when gas is sold by the therm than when it is sold by the 1,000 cubic feet. In other words—to put it plainly—the Gas Regulation Act of 1920 is regarded as a clever bit of trickery engineered by the gas undertakings for the sole purpose of increasing their revenue.

The majority of our readers will have had no difficulty in assimilating the principle involved by the therm system, and we do not propose, therefore, to enter into a detailed explanation of the benefits which it extends to all consumers of gas. We have, however, just recently received from the Department of Scientific and Industrial Research a booklet, entitled *The Therm*, which calls for notice. Anyone who is in doubt as to the justice of the present methods involved in the computation of the value of gas will find here a straightforward and non-technical presentation of the merits of the therm system, from which it may be readily gathered that the system is in one respect unique in that it provides simultaneously, not only a means for protecting both consumer and producer, but it has also an important bearing on the conservation of our national coal resources.

The main value of an opinion of this description lies in the fact that it is issued by a Government Department, and above (among others) the signature of Sir George Beilby. It goes without saying that in his knowledge of problems concerning the production and utilisation of fuel Sir George stands alone, and not the least valuable feature of the reports which have been issued under his direction is the dispassionate vein in which the facts are presented. So far as the gas undertakings' responsibility for the introduction of the therm system is concerned, it may be as well finally to dispose of a too popular fallacy by quoting from the preface of the booklet. Here it is plainly stated (the italics are our own) that the "*Fuel Research Board recommended* a method (the therm system) by which the charge to the consumer should be based solely on the heating quality of the gas; and, if a gas undertaking supplied a gas of low heating quality, they would only be able to charge for the number of therms in each 1,000 cubic feet."

Our own opinion is that the present agitation, which is mostly of an irresponsible nature, will very shortly die a natural death. It is merely another illustration of one of our racial characteristics, namely, indifference to change, and when the novelty of the word "therm" has worn off, no more notice will be taken of it than is at present taken of an electrical "unit." The public confesses that it does not understand what a therm is. On the other hand, how many consumers of electricity know what a Board of Trade unit is, and does it simplify the matter if you explain to the average housewife that it is merely a kilowatt hour?

The Position of the B.A.C.

As at the previous meeting, the British Association of Chemists, at their annual meeting in Manchester, devoted some time to the discussion of the desirability of an amalgamation with the National Union of Scientific Workers. It was explained that since last year arrangements had been made whereby the two bodies would hold joint council meetings with a view to ascertaining what portions of their respective policies were common to both, and to endeavour to secure concerted action whenever desirable. The present attitude of the British Association of Chemists, as presented by Dr. Levinstein, is that while the maximum amount of joint work is hoped for, an absolute and complete amalgamation is not calculated best to serve the interests of chemists. On the other hand, one speaker, while admitting that the B.A.C. should retain its own power of action, expressed himself in favour of complete amalgamation. As we pointed out when the matter was last under discussion, the probable drawback of such a policy would be the weakening of the appeal to chemists as a class consequent on the loss of identity which complete fusion would, on the present lines, entail. Such a movement tends towards the dispersion of chemists among other interests instead of towards their consolidation into the large and distinctive unity which is so badly needed at the present time.

One of the most interesting and stimulating of the speeches made at the dinner which followed the meeting was that delivered by Dr. E. F. Armstrong, who since his election as President of the Society of Chemical Industry has constantly urged British chemists to be "up and doing." One of the points which he continues to press home at every available opportunity is the urgent need of much wider publicity in regard to chemistry if the science, profession, and industry are to take their proper place in the mind of the public, and it is to be hoped that his advice on this occasion will not go unheeded. Dr. Armstrong averred that chemists generally had neglected publicity, but as we have repeatedly pointed out, certain sections not only neglect it, but deliberately obstruct it. Another important point made by Dr. Armstrong was the desirability of establishing and maintaining a very high professional standard among chemists. In an

association catering more largely for the economic requirements of chemists there is always the danger that the strictly professional aspect should not be regarded with the importance which it deserves, and therefore the suggestion that the B.A.C. should substitute the term "professional etiquette" for "trade unionism" may be worthy of careful consideration. The Association might well endeavour to emulate the achievements of the Institute of Chemistry in this direction.

The Transmission of Heat

WE have just received a copy of the ninth, and what many will be sorry to note is the last of the special series of reports which have from time to time been issued by the Department of Scientific and Industrial Research, and in which has been recorded the work done at, or in connection with, some of the National Factories during the war. As each of the Reports has appeared we have drawn attention to them in these columns, for we are of the opinion that they contain information, acquired as a result of first-hand acquaintance with practical conditions, which directly or indirectly must prove valuable to all industrial chemists. It is, of course, common knowledge that the brunt of the work of compilation has fallen upon the shoulders of Mr. W. Macnab, C.B.E., and those who have been wise enough to secure the whole series of Reports will not fail to recognise that the chemical industry owes no inconsiderable debt of gratitude to Mr. Macnab for the clear and concise manner in which the mass of information he has collated has been set out. The volume just to hand deals with the important and sadly neglected subject of heat transmission, and on this occasion we note that Professor A. W. Porter, F.R.S., has supervised the preparation of the material, and has drawn up those portions of the Report which relate to the theoretical aspects of the subject.

It must be said at once that the information which the Report contains will not bear dissecting, and it is not possible, therefore, in a brief notice of this kind to give an adequate idea of its value. One of the most important physical problems in factory practice is concerned with the laws governing the flow of heat through the walls of pipes. In the theoretical section of the Report we are reminded that if the temperature of a pipe wall, at the inside and outside surface, was known it would be a very easy matter to calculate the flow of heat. All that is usually known in practice is the average temperature of the liquid flowing. There is necessarily a gradient of temperature across the liquid when heat is being transmitted, and this is very often near the metal surface. Practically the whole of the difficulty of the problem is concerned with this fact; for it becomes necessary to calculate the distribution of temperature across the liquid or gas on each side of the pipe wall. This distribution varies very much from one case to another. If the fluid is moving very fast all except a very thin film is stirred up by the eddies that arise, and is practically at one temperature. In the film the heat is transferred, not by motion of the fluid, but by thermal conduction alone; and, since most liquids are very bad conductors, even a thin film introduces great resistance to the transfer of heat. The thickness of the non-eddying film depends upon the velocity of flow; it diminishes as the velocity increases, and there is a corresponding increase in transmission. A number of specific instances relating to heat transmission are considered, and in the experimental section of the Report reference in detail is made to actual investigations which were carried out at Gretna and elsewhere.

Points from Our News Pages

The determination of benzol in coal gas is discussed by A. Thau (p. 636).

A summary is published of an address on some aspects of British chemical industry delivered by Mr. F. E. Hamer (editor of THE CHEMICAL AGE), while in New York (p. 639).

At its annual meeting at Manchester, the British Association of Chemists decided to increase the amount of members' subscriptions (p. 640).

An abstract is given of an address by Mr. R. B. Pilcher on the position and prospects of the Institute of Chemistry (p. 643).

Legislation in chemical industry was dealt with by Mr. W. J. U. Woolcock, in his presidential address to the Northern Polytechnic Chemical Association (p. 644).

Sir Ernest Benn contributes an article disclosing the real nature of the programme adopted by the Labour party (p. 647).

According to our London Market Report, business has been steady with firm values and fairly well-maintained demand (p. 653).

Our Scottish Market Report records a moderate business with few important changes in price (p. 655).

Books Received

CHEMISTRY OF TO-DAY. By P. G. Bull. London: Seeley, Service and Co., Ltd. Pp. 311. 8s. 6d.

TECHNICAL RECORDS OF EXPLOSIVES SUPPLY, 1915–1918. No. 9: HEAT TRANSMISSION. By the Department of Scientific and Industrial Research. London: H.M. Stationery Office. Pp. 48. 5s.

The Calendar

Nov.		
6	Royal Institution of Great Britain: General Meeting. 5 p.m.	Albemarle Street, Piccadilly, W.1.
6	Institution of Rubber Industry: Dr. H. P. Stevens	Engineers' Club, Coventry Street, Piccadilly.
7	Institute of Metals (Birmingham Section): W. R. Barclay. 7 p.m.	Chamber of Commerce, New Street
8	Institute of Metals (North-East Section): Joint meeting with Local Section of the Institution of British Foundrymen. 7.30 p.m.	Armstrong College, Newcastle-on-Tyne
9	The Optical Society: Dr. R. S. Clay. 7.30 p.m.	Imperial College, South Kensington, S.W.7
9	Oil and Colour Chemists' Association: "Rosin and Rosin Oils—Their Chemical Constitution and Methods of Examination": C. E. Soane. 8 p.m.	Birkbeck College, Fetter Lane, E.C.
9	Institute of Metals (London Section): "The Production of Large Crystals of Aluminium and Some of their Properties": Professor H. C. H. Carpenter. 8 p.m.	Royal School of Mines, South Kensington.
13	West Yorkshire Metallurgical Society: "Aluminium": Dr. Bramley. 7.30 p.m.	Technical College, Huddersfield.

The Determination of Benzol in Coal Gas

By A. Thau

The writer describes the Berthold bottle, a new type of absorption vessel, which appears to have given considerable satisfaction in Germany in connection with the determination of benzene in coal gas.

THE determination of the amount of benzol hydrocarbons present in coal gas is one of the most important and at the same time most difficult and cumbersome analyses in connection with coking plants and gasworks recovering benzol from the gas. Tests are made of the gas before entering the benzol washers to determine the recoverable amounts of benzol present, but still more important is the analysis of the gas after it has left the washers to ascertain the efficiency of the scrubbing process, which is easily impaired by the quality of the absorbing oil. As the quality of the scrubbing oil, as to its absorbing capacity, may undergo sudden changes due to temperature, degree of viscosity, content of water, naphthalene, tar, etc., it is an imperative necessity to make daily benzol analyses of the "stripped" gas, as otherwise the fact that the efficiency of the scrubbing plant has decreased may not be noted until shown by a reduced output.

That the benzol analysis in gas is a rather difficult task is evident from the fact that there are almost as many methods in use to carry out this test as there are coking plants in operation, while for nearly all the other determinations applied to chemical control of coking and gas plants standard methods are universally adopted.

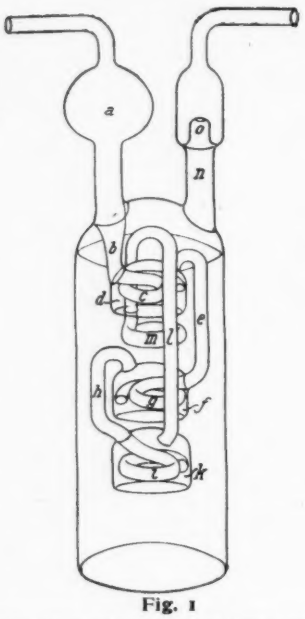


Fig. 1

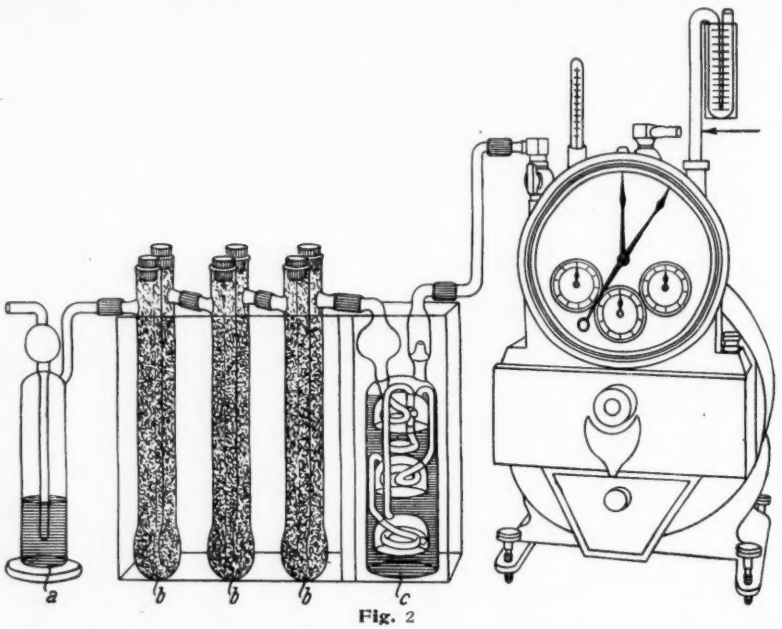


Fig. 2

The different methods suggested and adopted in the principal coke-producing countries have from time to time been described in the technical Press, without, however, stating a method which would justify the claim for a universally applied standard way of testing.*

The writer has endeavoured to collect all available data regarding the different methods suggested for this determination with the purpose of submitting them to a comparative test to find out which method gives the least trouble, requires the least time, and gives at the same time the most correct and reliable results.†

From a close investigation it appears that in England and America the benzol hydrocarbons are absorbed in scrubbing oil, and so much gas is washed during the test that in distilling the scrubbing oil sufficient benzol is being collected to determine its quantity by measure.

On the Continent a special absorbing oil is used for the purpose, comparatively small volumes of gas are scrubbed, but the tests dispense with a subsequent distillation, and the amount of benzol absorbed in proportion to a measured volume of gas is determined by weighing.

In another method, originating from St. Claire Deville, in France, the benzol hydrocarbons are not absorbed at all; but by passing the gas through a weighed spiral tube (buried in carbon dioxide snow in a Dewar vessel) the benzol hydrocarbons are deposited as ice and are then determined by weighing.

A number of methods should also be mentioned which determine the amount of benzol hydrocarbons present in the gas indirectly by physical tests, as for instance (*a*) in relation to photometric results, (*b*) relative to the vapour pressure exerted by the benzol, (*c*) by specific gravity, (*d*) by the calorific value of the gas, or even calculated in relation to the results of the complete analysis of the gas. Needless to say, all these methods, as far as they have been developed at present, are quite useless in actual practice, and do not, therefore, demand further consideration.

The same applies to purely chemical tests, as suggested by Lunge and others, in which the benzol is determined as dinitrobenzol or supposed to combine with a solution of nickel cyanide. Also the efforts to determine the content of benzol by volumetric gas analysis have been in vain. This is easily understood as, if the huge gas volumes passing continually through the scrubbers are compared with the 100 c.c. generally taken in standard gas analysis apparatus, it becomes evident that differences so small as being impossible to be read on the graduation of the gas burette would make a tremendous difference in results when calculated in proportion to the actual volumes of gas being dealt with in scrubbing.

Since rubber is an absorbent for benzol hydrocarbons, it will be understood that the greater the number of rubber connections in relation to the number of absorption vessels applied the more is the accurate issue of the test impaired. The problem as to whether it is more advisable to scrub small

* *Gas World*, 1915, p. 189; *Journ. f. Gasbeleuchtung*, 1915, p. 61; *Journ. f. Gasbeleuchtung*, 1915, p. 616; *Gas World*, 1916, Coking Section, October, p. 20; *Journ. f. Gasbeleuchtung*, 1916, p. 323; *Gas World*, 1917, p. 222; *Gas World*, 1917, p. 272; *Gas World*, 1917, p. 278; *Gas World*, 1917, Coking Section, November, p. 9; *Journ. Soc. Chem.*, 1917, vol. 36; *Chem. and Met. Eng.*, 1917, vol. xvii., p. 550; *Gas World*, 1920, Coking Section, April, p. 15; *Chem. and Met. Eng.*, 1920, vol. xxii., p. 705; Whitehead, *Benzol: Its Recovery, Rectification and Uses*, 1920, p. 195.

† *Glückauf*, 1921, Nr. 22–24.

volumes of gas and determine the absorbed benzol by weight or to pass large quantities through the oil and drive off the benzol afterwards the writer has tried to solve by a number of comparative tests which yielded fairly corresponding results. But as the former method of determining the benzol by weight is so much quicker and less troublesome compared with the latter, it fully deserves the increasing preference given to the test.

Before dealing with the most simple and reliable method in this connection, attention should be drawn to the fact that in determining absorbed benzol by weight it is most essential that the gas, before being conducted through the absorbing oil, should be perfectly dry, as any water carried over in the form of vapour would be absorbed and determined as benzol, thus upsetting the results.

It is not intended to dwell here upon the very extensive tests which have been carried out by different investigators to find a reliable drying medium for the gas. The only effective medium not requiring preliminary treatment is concentrated sulphuric acid, but as this also absorbs benzol hydrocarbons it is not applicable in this test. None of the other generally applied moisture-absorbing reagents, like calcium chloride, phosphorus pentoxide, etc., gives sufficient assurance of retaining the last traces of moisture from the gas passing over them after they have already absorbed some moisture. The best method is to pass the gas through large U-tubes filled with calcium chloride, dried by heat, the tubes being buried during the test in ice so that the vapour tension of the steam in the gas is eliminated altogether.

The gas, dried perfectly by these means, is then conducted through weighed absorption bottles filled with oil for absorbing or through a spiral (buried in carbon dioxide snow in a Dewar vessel) for freezing out the benzol hydrocarbons.

The Absorption Test

For a time the last-mentioned method was much in favour on the Continent in dispensing with an absorbing medium altogether, but on account of the fact that carbon dioxide must always be kept in stock in steel cylinders which are cumbersome to be carried about, that great care has to be observed in handling the carbon dioxide snow, that the glass spiral is very easily broken by the great changes of temperature to which it is subjected, and that the test by the consumption of carbon dioxide is rather expensive, the absorption test with the determination of the benzol by absorption in oil and subsequent weighing has gained much favour compared with the freezing method.

For the absorption test, with subsequent weighing of the benzol, only comparatively small amounts of oil and light absorption vessels should be used, so that they can be weighed on a normal chemical balance. The first vessel applied to this test was the well-known potash bulb, of which up to six were jointed together in series by rubber connections to obtain complete absorption. A drawback of the potash bulb is the ease with which oil is carried over with the gas, vitiating the results altogether, and also the difficulty in cleaning its uneven outside surfaces before weighing.

To improve the method and to gain greater simplicity in handling the requisite apparatus, and further to eliminate errors in weighing as much as possible, many efforts have been made to enhance the efficiency of the absorption vessels so as to be able to reduce their number. This development has been responsible for a great number of designs, and a construction has now been suggested by Dr. Berthold which requires only one single absorption bottle for the test. In designing this absorption bottle, Dr. Berthold based its construction upon the fulfilment of the following five conditions :—(1) The more frequently the gas is passed through the absorbing oil the more efficient will the absorption be, and the greater can be the velocity by which the gas is conveyed ; (2) every single gas bubble must, by the different sealed exit tubes by which it is released in the oil, be divided into about ten smaller bubbles ; (3) the bottle must consist of glass only, without rubber stopper and without ground-glass joints, and its outer surfaces must be easily cleanable ; (4) the pressure resistance caused by the bottle, filled with absorbing oil, must be small, even if the gas is being washed four to five times on its passage through the bottle ; (5) it must be made quite impossible for the gas to carry over even the smallest traces of oil upon leaving the bottle, and an oil-retaining arrangement must efficiently prevent this.

The bottle employed by Dr. Berthold is shown in Figs. 1 and 3.

The gas enters by the tube *a* (Fig. 1), which is blown out to a large ball in order to prevent the oil from coming over in case of temporary back pressure when starting the test. From th

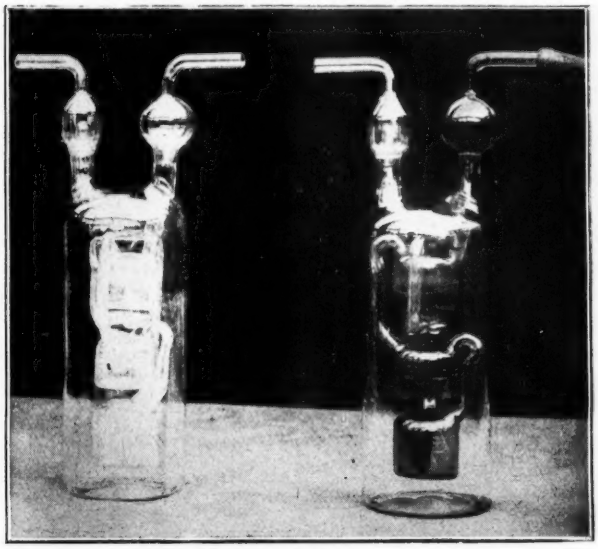


Fig. 3

inlet tube *a* the gas is conducted through the connecting tube *b*, which extends as a ring-shaped, horizontally suspended coil *c*, open at the end, in the closed bell vessel *d*. The whole bottle is filled with oil up to the top of the bell *d*, the gas passing through the coil *c* being in contact with the oil and being washed throughout its travel, leaving the coil in form of small bubbles which are again washed inside the bell vessel *d*. The gas so washed leaves the bell vessel *d* by the upper outlet pipe *e*, which is bent downwards and enters the middle bell vessel *f* by means of a similar open coil *g*. In the vessel *f* the gas is again washed and divided up ; and, leaving through the connection *h*, passes through the open coil *i* to the bottom vessel *k*. For the third time split up into small bubbles, the gas leaves the bell *k* by the outlet tube *l*. The latter is conducted upwards, bent over the top of the upper absorption vessel *d*, and forms at a short distance below the bottom of the bell *d* an open ring coil *m* rigidly suspended in the bottle and submerged in oil. On leaving the coil *m*, the gas is washed for the fourth and last time and collects in the top space of the bottle above the oil, leaving the bottle by the outlet *n*, which is fused to the outer shell of the bottle and not connected to the interior arrangement. Although it is almost impossible by these means for the gas to carry forward oil from the bottle, there is a further precaution taken by a nozzle *o* with a needle-fine opening, which is fused into the enlarged portion of the gas outlet tube *n*, and serves as an oil separator.

Absorption Oil

The most satisfactory absorbing medium for stripping the gas of its benzol hydrocarbons has been found to be odourless and water-white medicinal petroleum oil prepared according to the specification of the German pharmacopœia. Its specific gravity is about ·8863 at 15° C., and in distilling it yields the following fractions :—

		boiling point.
	330 deg. C.	
Up to	350 „	5·0 per cent.
„	360 „	7·5 „
„	370 „	11·0 „
„	380 „	31·0 „
„	390 „	49·0 „
„	400 „	66·0 „
„	408 „	90·0 „

(Residue liquid of low viscosity.)

The commercial quality as bought is not always directly applicable and is never to be trusted for this purpose without having undergone preliminary treatment. A corresponding quantity should be heated in open dishes with large surfaces at 120° C. for a considerable time to expel any water or light

constituents it may contain. It is then filled into an ordinary gas wash bottle and weighed exactly. Heated air which has been passed through 66° sulphuric acid is then steadily forced through the oil for several hours, and if upon weighing again no decrease in weight can be noted the oil may be used for the benzol test and the bottle described above can be filled up to the top of the upper bell vessel *d* by applying suction to the outlet tube *n*. The inner vessels connecting tubes and coils are completely filled with oil as well as the space surrounding them inside the bottle.

In applying the Berthold bottle to the benzol test it is weighed and connected to an arrangement as shown in Fig. 2, in which *a* represents an ordinary gas wash bottle containing a saturated solution of picric acid in order to retain the naphthalene which is carried forward as vapour with the gas. The bottle *a* is connected to a set of three large U-tubes *b b b* filled with calcium chloride, the tubes being placed in a tin box and packed into freezing mixture consisting of small lumps of ice mixed with common salt. Similarly the absorption bottle *c* is surrounded by a freezing mixture. Connections are made by pieces of stout rubber tubing, but in order that no rubber may be exposed to the gas the gas-tubes are pushed close together, end to end, in the rubber connections. To the outlet end of the absorption bottle *c* is connected an experimental gas meter provided with a thermometer and gas pressure gauge. To the outlet pipe of the meter a filter pump or similar suction device is connected to pull the gas through the apparatus should the pressure by which the plant is operated not suffice to overcome the resistance caused by the arrangement.

For a test 300 to 400 litres of gas are passed through the apparatus at a velocity not exceeding 50 litres per hour. By means of the freezing mixture the gas and oil are cooled to a temperature of −15 to −20° C., so that the vapour pressure of the benzol is reduced considerably. After the above-mentioned volume of gas has been washed the test is discontinued, and the bottle is cleaned on its outside by carefully wiping and drying its surfaces with cotton wool. The gas contained in the upper part of the bottle is carefully displaced by air and, after having reached room temperature, the bottle is weighed again, when the increase in weight represents the amount of benzol hydrocarbons contained in the volume of gas ascertained by the readings on the meter, the gas volume being corrected in the usual manner.

The simplicity of the test is obvious and becomes still more apparent in that the bottle once filled can be used for an indefinite number of tests without the oil being changed.

Progress in Chemical Industry

The Position of the Works Chemist

MR. A. TROBRIDGE, chairman of the Newcastle Section of the Society of Chemical Industry, opened the winter session of the Section on October 25, by delivering an address on "Fifty Years of Chemical Industry."

Mr. TROBRIDGE said that fifty years ago facilities for higher scientific training were conspicuous by their absence. He rejoiced to note, however, that in recent years, the university-trained chemist was coming into his own. There was hardly a trade or industry in which the chemist was not now functioning. Colonel F. R. Simpson, speaking at a gathering of their Society last year, had said that most collieries now employed a "tame" chemist. Certainly, said Mr. Trobridge, fifty years ago, a colliery owner who employed a chemist of any variety would have had his sanity questioned. In the old days the employment of chemists was almost entirely confined to the Le Blanc Soda Works, and by no means general there. Rule of thumb reigned supreme in many works, and as late as 1870 they found the Chief Inspector complaining that work which should have been done by a works chemist was done by his inspectors.

The chairman then described the development of the industry following upon the Alkali Act of 1863. He showed how the makers were forced to consider the question of condensing HCl, and how they recognised that the assistance of the trained chemist was required more and more. He did not agree that the Tariff regulations were responsible for the decline of the colour industry in this country as was often said. He agreed with Dr. W. H. Perkin, who so far back as 1885 said that the chief causes were the effect of our patent laws and the want of technical education in this country. Dr. Perkin said, "We find that in Germany the manufacturer understands the value of well-trained chemists, and sympathises with them; they also understand the value of theoretical chemistry. This is a condition of things we do not find in this country. If it is found profitable to employ chemists of this class on the Continent, surely it should be found equally profitable to employ them here."

Value of Chemistry

Professor HENRY LOUIS said he had had much the same experience as Mr. Trobridge, excepting that his experience as a works chemist was largely in ironworks. Ironmasters, even at that early stage, were forced to recognise that there was some value in chemistry, though he remembered incidents which showed the recognition was not universal. He remembered going to a large blastfurnace firm in Scotland to buy pig iron. He asked the manager what percentage of silica there was in one of his brands. The manager replied, "Sir, we have never sold our pig iron on a chemical analysis and, please God, we never shall." He remembered as a young man being offered the post of chemist for a manganese producing concern at the munificent salary of £80 a year.

Need of Fundamental Research

Professor N. HAWORTH said the chemist had made his position because he turned his knowledge to account in £ s. d. The process had been a slow one, and restricted to some industries. It had been unfortunate, perhaps, that in this country we had been amongst the first to establish the manufacture of heavy chemicals. The manufacture of heavy chemicals was a less delicate process, on the whole, than the manufacture of dyestuffs, though equally important. But the number of chemists who needed to be employed in the one was much smaller, of necessity, than the number for fine chemical manufacture. Since profits were to be made immediately in the heavy chemical industry, capital was reluctant to contribute to chemical research which might only be reproductive in dividends after some years. That reluctance on the part of shareholders had been somewhat overcome by the necessities of the war, but one felt that even now the fine chemicals and dye industries were in great danger of suffering extinction because the chemists employed therein were not given the recognition which was their due. Organising and reorganising would not re-establish the dyestuffs industry. The only way to bring it about was to get together a band of energetic chemists, working in complete harmony, who were creative, original, whose work would not be for to-day or to-morrow, but for the years to come; men who would assemble facts which would only find a place in chemical industry after a lapse of time. There again one observed a lack of faith in that direction. The tendency was to provide for the immediate present, and not for the future. If one might utter a warning it would be: Do not try and carry on from day to day, but think ahead, think of what is to be needed in the next five or even ten years. The disappearance of laboratories devoted to research was not only regrettable, but deplorable, because it could only mean, in the long run, that the endeavours of scientific men and real patriots would ultimately be lost, and whilst every industry at the present time was in a state of depression he believed there would be a better time, and the question would then arise as to whether industries recently re-established had provided for that time.

The Heavy Chemical Industry

Mr. A. RUDGE admitted that he could not see any indecent haste on the part of employers to employ more chemists or to pay them more than before. He did not quite agree that the position of the chemist in Germany was so much better than here, if as good. He had seen highly qualified German chemists working 84 hours for what was the equivalent of two pounds per week. With regard to the alkali industry, it was not generally realised how modernised were the methods adopted to-day. Practically every raw material had a balance sheet, steam was checked, and everything had to be accounted for in a manner which was not dreamed of even ten years ago. In the past ten years enormous strides had been made, and the heavy chemical industry of this country was holding its own.

Some Aspects of British Chemical Industry

A New York Address by the Editor of "The Chemical Age"

At the October monthly meeting of the New York section of the American Chemical Society, held at the Chemists' Club, New York, a welcome was given to Mr. F. E. Hamer, Editor of "The Chemical Age." Dr. Ittner presided, and the speakers, in addition to Mr. Hamer, included Dr. Parsons, Secretary of the American Chemical Society, and Dr. Hendrick. Below is given a summary of Mr. Hamer's address.

On the eve of my departure, Sir Ernest Benn, the chief of the firm of Benn Brothers, Ltd., which I represent, genially warned me that in no land was such hospitality to be found as in the United States. He said: "You will find the American people talking dollars, but practising Christianity and social friendship and hospitality in a way that no other nation can." That picturesque statement has been, in my case at least, literally true. Everywhere I have been received with a cordiality almost beyond belief, and it is a real gratification to find THE CHEMICAL AGE so well known and so widely followed over here for the information it gives of the current of events and thought in England. It requires an effort of imagination to realise one is in a strange land; one sinks into American conditions very much as one sinks into a comfortable armchair; and to-night the presence of personal friends, like Dr. Parsons—intimately known as "Charlie"—Dr. Hendrick and Mr. Parmelee, the editor of *Chemical and Metallurgical Engineering*, makes one feel completely at home.

British and American Conditions

The first impression formed in the course of a few days' observation is a sense of the almost complete similarity between English and American conditions and habits of thought. In the chemical industry the lines are practically parallel. Following the armistice there was a boom which produced an unhealthy activity and brought into the industry a speculative class not usually present. Then, with dramatic suddenness, came a slump of extraordinary duration and severity, which taxed the resources of even the big firms and wiped out many of the smaller concerns. Now, at last, there is a revival which, if slow, is genuine, and by degrees the volume of sound trade is slowly being resumed.

Chemical Legislation

In particular, one cannot help being struck by the resemblance between the two countries in two matters which are affected by political influences—namely, the dyestuffs industry and the fine chemical industry. As regards the former, you have undergone a sharp reversal of policy, which, from what I hear, is causing grave anxiety, and the full effects of which will not be known for some time. Various explanations are offered, about which I should like to know more before coming to any definite opinion. In our case, however, the position is fairly clear. The Dyestuffs Act is in operation, providing a licensing system under which no foreign dyestuff can be imported except under a licence. To the manufacturers, this, of course, is a welcome aid in their effort to develop a national industry. The consuming class, as represented by such bodies as the Colour Users' Association, appears to be fairly well content—or, at least, quite prepared to put up with temporary inconveniences to secure the national ends in view. The opposition to the Act comes from two classes, in the one case general, and in the other specific. The first class is the traditional Free Trade Party, representing what is known as the Manchester School. They have always held to the doctrine of free importation and of buying in the cheapest and selling in the dearest market; and now that the perils of war are over they desire to revert to pre-war conditions. Apart from the economics of the question, however, there is one moral aspect which the most pronounced Free Trader cannot ignore. When supplies were cut off from Germany we began to realise an unsuspected weakness in the policy of depending for necessaries on foreign sources. It was essential then that we should hastily begin to provide for ourselves, and the moral pledge given to those who undertook this work that they would not be deserted when the war was over has to be faced by all honest citizens. I believe the country wishes to keep faith with those who entered the dyestuff industry, and so far faith has been kept.

The other class from whom opposition has come quite naturally is the merchant class—a very important body of importers and exporters who have developed markets for British goods all over the world. Naturally, they are now anxious to revert to the old basis on which their business has been built, and they are active critics of the restrictions on free imports. The issue, however, is really a simple one. The nation has promised definite protection for the dyestuffs industry over a period of years, and it is impossible to give this protection and at the same time open the country to unrestricted competition. The position has been made fairly clear to the public, and so far when the question has been raised in Parliament there has been a decisive vote in favour of continuing the Act.

British Dyestuffs Industry

During the discussion some interesting points have been brought out. The first is that the common objection that the high price of home-produced dyes was penalising the textile industry has been shown to be a myth. Figures show that the price of dyes is an insignificant factor in the price of the finished textile, and that the stagnation of the textile industry is due to other causes. Secondly, the subtle character of German policy has effectually been brought out. It would, no doubt, pay Germany well to sell at any prices that would break down the British industry; and for dyes produced in England Germany has been quoting very low prices. On the other hand, for dyes not produced in England Germany is charging high prices; and once we ceased to produce and had to depend on Germany there would be nothing to prevent the latter from imposing monopolist prices, and so seriously damaging our textile industry in competition with her own. The position, as I have said, is now fairly well understood, and in spite of the troubles and mistakes, the British dyestuffs industry as a whole may claim to have made very good progress.

As regards fine chemicals, the position is by no means so simple, but the Safeguarding of Industries Act is regarded by manufacturers as a distinct help. We must, however, wait to see future developments before saying definitely what effect it is destined to have. Incidentally, it is of interest to hear that the quality of German chemicals has deteriorated appreciably since the war, and that in many fields British firms are now producing superior articles.

Work of the A.B.C.M.

As to the general position of British chemical industry, the signs all point to progress. The most important organisation we have is the Association of British Chemical Manufacturers, which has changed the habit of mind among the producing class. Formerly it has been a general habit among manufacturers of all classes to work on an individualist basis, keeping their secrets—or what they fondly regarded as secrets—strictly to themselves. That has now been changed. We have a much freer interchange of experience and ideas, and chemical manufacturers are now beginning to pull their full weight as the result of this co-operative policy. The value of research, again, is being more and more recognised as an indispensable part of industrial organisation, and considerable progress has been made in the establishment of generally accepted standards. I was much interested in what Dr. Parsons said as to the work done by the American Chemical Society in supplying a service of chemical news to the daily and the technical Press. In that matter the industry has much to learn. Not only is there no organised effort to educate public opinion as to the national importance of chemistry, but the efforts of the Press to report proceedings and give the public some notion of what is being done are deliberately resisted. The effect of this policy of repression is obvious: it deprives chemistry of the influence it ought to carry in public affairs, and its general effect is to hinder instead of helping.

The Chemists' Club

I cannot close without a word of appreciation of this excellent institution, which serves as a social centre for chemists and chemical interests. You are fortunate in having such a comfortable permanent home, and you are wise in insisting that the management and membership shall be on the most democratic basis, and in making the membership really representative not only of professional chemists, but of great interests such as banking, which are often behind chemical enterprise. The Chemical Industry Club of London would, in my opinion, be well advised to adhere to the principles which have made this club so successful, and to resist the temptation to seek either patronage or subsidy from outside itself. Once those influences are admitted they are bound to undermine the self-respect of any institution and to weaken its own vitality.

It is a delight to find so little difference between the British and American people in their aims, sympathies and points of view. I believe that these interchanges of visits and ideas promote good understanding, and that for the great majority of both nations the only possible policy is a policy of peace and goodwill, and the only possible rivalry that which shall best serve the welfare and progress of mankind. (Cheers.)

The British Association of Chemists

Fifth Annual General Meeting and Dinner in Manchester

THE fifth annual general meeting of the British Association of Chemists was held at the Midland Hotel, Manchester, on October 28, Mr. W. E. Kay presiding over a very large attendance of members.

The Chairman expressed, on behalf of their president, Professor Hinchley, his great regret that he was unable to be present.

In the absence of the treasurer, the secretary submitted the report and balance sheet for the year. Had it not been for the gratifying response made by a large number of members to the Council's appeal for supplementary donations, the adverse balance of £40 3s. 1d. would have been larger. Another point was that delay on the part of many members in the payment of their subscriptions had seriously hampered the work of the Association by imparting a feeling of insecurity in regard to finances.

The Chairman explained that it had been decided by the Council not to increase the subscription but to trust to the voluntary efforts of the members. The matter had, however, been discussed at the meeting of the Council that morning, and an opinion had been expressed that the more courageous plan would be to increase the subscription by, say, 5s. rather than to place the burden of the increased expenditure on the shoulders of a few people.

A long discussion then took place respecting the advisability of raising the amount of the annual subscription to the Association, and it was finally decided by a vote of 33 in favour and 17 against that the subscription be increased to 30s. per annum.

Review of the Year's Work

The adoption of the report of the Council for 1921–22 was moved by Mr. Mansbridge, seconded by Mr. E. B. Anderson, and carried unanimously. The report, which was taken as read, stated that the acute depression in the industries of the country has seriously affected the finances and membership of the Association, and the Council regret to report that during the past year they have been compelled to restrict materially the activities of the Association, especially in regard to the undertaking of new work. Progress, however, if slow, has been made, and the Council considers it a matter for some satisfaction that in such difficult times the Association has been able to put into operation the Unemployment Benefit Fund.

A decrease is reported in the membership for the year. This is due mainly to the removal from the active list in November last of the names of those whose membership has lapsed, owing to the operation of the Rules. A considerable number of these have since been re-admitted to the Association. 39 new members have been elected, 283 have resigned or have been removed from the Register as above, and losses due to death amount to 5. The effective membership is thus 1,095, compared with a nominal roll of 1,344 at the commencement of the year.

Unemployment Fund

The Rules for the Unemployment Benefit Fund were formally adopted at an extraordinary general meeting held at Manchester on July 8, 1922, and the scheme came into operation as from July 1, 1922. The inauguration of this fund marks another step in the progressive economic policy of the Association, and the Council relies on the loyal support of all members in order to make the scheme an unqualified success.

The work of the Appointments Bureau necessarily has been affected by the continued depression in trade. In addition to the circulation of notices of appointments extracted from the technical and other journals, endeavours have been made to get into direct touch with employers and possible employers of chemists, in order to induce them to communicate their requirements to the Bureau. From the results obtained, the officers of the Bureau are of the opinion that but for the general depression the procedure would have proved highly successful, and it is intended to extend this system.

An increasing number of the members have made use of the facilities afforded by the Legal Aid Fund during the year. The issues involved in these cases has been of great importance, particularly in the matter of service agreements.

External Relations

Relations between the Association and the various other scientific organisations have been uniformly of a cordial and harmonious nature.

The proposals instituted by the National Union of Scientific Workers for amalgamation with that organisation have received the careful attention of the Council. The sections generally are unanimous that the Association should work as closely as practicable with the N.U.S.W., and the Council are agreed that the name and identity of the Association should be retained in any arrangement which may ultimately be made for joint working between the two Associations.

A special committee has under consideration a comprehensive scheme for the complete re-organisation of the profession, including provisions for a legal re-definition of the term "chemist" and the compilation of a statutory register of all practising chemists.

Educational Facilities

As a result of an inquiry into the facilities existing throughout the country for those employed as laboratory assistants during the day to pursue systematic courses of evening study, enabling them to obtain eventually the A.I.C., or a university degree, or equivalent diploma, it has been found that such facilities as exist are mostly confined to the larger towns, and in a few cases only do the evening courses lead up to the standard required for the A.I.C. Time alone, accompanied by the stabilisation of the economic resources of the country, permitting increased grants of public funds for educational purposes, can materially improve the existing facilities.

Lengthy consideration has been given to the question of the advisability of the termination of the "B" qualification. Proposals have been submitted providing that after December 31, 1923, no candidates, other than those registered prior to this date as probationers or students, should be admitted to full membership unless they conform to the requirements of the "A" qualification, the rights of all probationers and students at that date being in no way prejudiced. The Nominations Committee were accordingly requested to hold an inquiry into the status of the "B" qualification. In their report, the Committee stated that, owing to the increasing difficulty of arriving at a satisfactory decision on many applications under the "B" qualification, due to the doubtful or indeterminate nature of the evidence submitted, they recommended that this qualification should be terminated at an early date. The Council recognise a general desire that the standard of the "B" qualification should be raised, but in view of the report of the Education Committee on the inadequacy of the educational facilities, a decided difference of

opinion exists as to the early termination of the qualification.

Dr. F. W. KAY, in the course of a discussion on the report, referred to the graduation of an excessive number of chemists at the universities. He thought it was within the scope of the B.A.C. to suggest that a certain amount of curtailment might be made in this direction, or at least the necessity for curtailment might be ventilated.

The CHAIRMAN said that the universities were turning out four times the number of chemists every year that they used to do. The Council would take cognisance of this particular aspect of the discussion, and would consider some method of warning those who entered the profession of what lay before them.

Election of Officers

The following were among the elected officers for 1922–1923: *President*, Dr. H. Levinstein; *Past-President*, Professor J. W. Hinchley; *Vice-President*, Mr. F. Scholefield; *hon. treasurer*, H. E. J. Cory; *hon. registrar*, Dr. David Bain; *hon. editor*, R. Brightman; *general secretary*, Mr. S. Reginald Price; *assistant secretary*, Mr. A. Stewart Mills.

The Annual Dinner

The annual dinner was held at the Midland Hotel, and there were about 150 guests. Among those present were Dr. Herbert Levinstein (the President), Mr. W. E. Kay, Major Church, Dr. G. F. Armstrong, Professor Lapworth, Messrs. E. B. Anderson, F. Scholefield, R. Brightman, S. Reginald Price, and A. Stewart Mills.

British Chemical Industry

Dr. H. LEVINSTEIN proposed the toast of "The British Chemical Industry." In doing so, he said that, having studied the charter of the Institute of Chemistry and also read with some care the report of the council of the B.A.C. for the past year, he thought there was no doubt that if the aims and objects of the B.A.C. were made properly known and carried out, the organisation could be made to include practically all the chemists of the country. The Institute of Chemistry had grown until, in a way, substantially it did include most of the chemists in the country, but, as a chartered institution, its objects were entirely different from those of their own Association. They both of them ought to have among their members practically all the chemists of the country, because they could do what the Institute could not do. The constitution of the B.A.C. was so framed—that was why they were trade unionists—as to be able to deal with the economic side of the chemists' interests in a way which the Institute, by its constitution, was precluded from doing. There was, however, an enormous difference between a registered trade union and a trade union of chemists. The chief difference was—so it seemed to him—that the people who employed chemists, the universities and institutions of a public character, and also large employers, were all just as much interested in raising the status of chemistry as the individual chemist himself. No element of this kind entered into the relations of the workman and his employer in the ordinary way. The very idea that there should be collective bargaining in order to secure minimum fees or minimum salaries led, in his opinion, to retrocession rather than to advancement in the status of the profession.

Such questions as the stabilisation of remuneration, and the establishment of rewards for patent rights of inventions, and all other troublesome things which might arise, could very readily, and wisely, be discussed with a body of employers such as the Association of British Chemical Manufacturers.

Need of Increased Publicity

It was necessary for the B.A.C. to adopt a publicity campaign for the purpose of increasing its membership. The *Bulletin* was a most excellent document for the purpose. He would also strongly advocate using the chemical journals, of which several in this country were showing suitable energy. They were very much indebted to *The Chemical Trade Journal*, which was a very old-established paper, and which had in many ways assisted the B.A.C. very considerably. He had a great regard for that paper. But, besides that journal, they had THE CHEMICAL AGE, which was a very live paper, and which to his mind was rather "coming out," and was going to take about the same place as, before the war, the *Chemiker Zeitung* did. He would also strongly commend their notice to the *Chemical Review*.

The Society of Chemical Industry

Mr. S. REGINALD PRICE proposed the toast of "The Society of Chemical Industry," coupled with the name of the President, Dr. E. F. Armstrong. In expressing the hope that Dr. Armstrong would explain the aims and objects of the B.A.C. to the Society of Chemical Industry, he said that, although they were a trade union, they were attempting to make it an ideal one—*i.e.*, a trade union which was trying to see the point of view of the employer as well as the employed.

Dr. E. F. ARMSTRONG, in responding to the toast, said that the Society of Chemical Industry, of all the societies, was perhaps the one which had the welfare of the individual chemist most at heart. Nevertheless, it heartily welcomed the establishment of other bodies, such as the B.A.C. The plea he wanted to put forward was that as far as possible they should always work together and speak with one voice. There were points upon which chemists seemed to require a certain amount of self-examination. Were chemists to-day so constituted temperamentally and by training as really to deserve success? Publicity had been neglected by them. After all it was the brain of the chemist which had rendered possible most of the progress which had taken place during past years. The chemist had not, however, received the credit for such discoveries because they were left to other professions to develop. Other professions came before the public eye because they were able to make themselves and their doings understandable. Britain had made its name in the world. If one travelled about the world one realised that more and more every day. It had made its name in the world because what Britons had done they had tried to do really well.

A High Professional Standard

He had a terrible feeling at the back of his mind—he wanted to express it quite frankly—that chemists had let down their quality during the war years. In other words, if they were to succeed as chemists they must have a very high professional standard. That evening there had been talk of trade unionism. To him it was a most hateful word, because trade unionism meant, in the minds of all employers, a compulsory lowering of quality. Let them substitute the term "professional etiquette" and aim as high as they possibly could. He realised to the full the great difficulties against which the B.A.C. had striven. The outcome of the early work of the Association most definitely was to put the Institute on its feet. As the position appeared to him to-day it was roughly this. They had the Institute, which was very nearly representative of all that had passed in British chemistry. The "F.I.C." to-day did not mean one had passed an examination and belonged to a narrow class of public analysts and consultants; it meant that one was a professional man of high standard. That was an achievement, because anyone could be proud of belonging to his profession, but one need not necessarily be proud of belonging to a particular section of it. The B.A.C. was doing a very great work in rallying together what might be called the left wing of the party; people not content to wait and see, people who must be up and doing. Quite frankly, and as the son of his father, he was bound to be a revolutionary, and in his opinion the more people they had like the members of the B.A.C. the better. Unless more of them were up and doing they would not get very far. What the chemical profession lacked was leaders, and what British politics lacked was leaders. They were all in the same boat at the present time. The only way to find leaders was to give the young men a chance. In his capacity as President of the Society of Chemical Industry, he wished the B.A.C. every possible success, and promised them all the assistance the Society could give.

Major CHURCH proposed the vote of the B.A.C. and advocated the importance of concerted action among working chemists. Mr. E. B. Anderson, who responded, supported Major Church's view.

Mr. R. BRIGHTMAN proposed the toast of "The Universities," to which Professor Lapworth responded.

Mr. W. E. KAY proposed the toast of "The President," and Dr. Levinstein having responded, the proceedings closed with a vote of thanks to Mr. C. W. Carpenter and the secretary of the Manchester branch of the Association for the excellent way in which they had made the arrangements for the meeting.

Society of Dyers and Colourists

Manchester Section

THE second meeting of the Manchester Section of the Society of Dyers and Colourists for the Session 1922-1923, was held at the College of Technology, Manchester, on Friday, October 27, Professor Knecht presiding.

A paper on "A Hydroxy-stearic Acid and Some of its Derivatives," by L. G. Radcliffe, M.Sc.Tech., F.I.C., and W. Gibson, M.Sc.Tech., was then read. It was explained that the present paper was a continuation of one published in March, 1920, in the Journal of the Society of Dyers and Colourists, under the title "The Action of Nitric Acid on Saponifiable Oils," by one of the authors and C. Polychronis.

In this paper it was stated that upon the experiments recorded therein it appears that the action of nitric acid on various oils varies according to the nature of the fatty acids which enter into their composition. It was pointed out that with the saturated fatty acids there was little action in the cold with even 99 per cent. fuming nitric acid, but that the hot nitric acid caused oxidation, and in the case of stearic acid, isonitro-stearic acid was found among the other oxidation products. In the case of the unsaturated acids such as oleic acid, ordinary nitric acid reacts in the cold, but the reaction takes place very slowly, whereas fuming nitric acid reacts much more vigorously, and even at quite low temperatures yields a nitrated product.

Sulphonation of Oleic Acid

The paper referred to some former work on the sulphonation of oleic acid, which resulted in the formation of hydroxy-stearic acid, and then went on to detail experiments having for their object the determination of the chemical composition of various products formed by the action of nitric acid on pure hydroxy-stearic acid. The earlier part of this work was the preparation of hydroxy-stearic acid itself and a number of characteristic derivatives.

The starting point for the hydroxy-stearic acid was an oleic acid of about 93 per cent. strength, which by treatment with sulphuric acid, as described in a previous paper, gave rise, after the product of the first reaction was treated with water, to the hydroxy-stearic acid melting at 85° C. The composition and properties of this hydroxy acid corresponded to those recorded by previous workers. From this acid the authors have prepared, for the first time, the methyl ester of hydroxy-stearic acid in the form of white flakes, melting at 46° C. Further, the ethyl ester melting at 48.5° and an acetyl derivative, melting at 32°, were made, but all attempts to benzoalate the acid failed to yield a derivative in a state fit for analysis.

Preparation of True Nitro Compounds

A study of the interaction of bromo-stearic acid and silver nitrite was described, having for its object the preparation of true nitro compounds of stearic acid. Many experiments were detailed, with references to the work done by other investgators, and as a conclusion it was stated that no such nitro acid could be obtained, and a similar failure took place when silver nitrate was used. In every case the reaction proved to be not a simple double decomposition, and the products did not contain nitrogen. The views previously set forth by Senter were confirmed, and only the more or less impure alpha-hydroxy-stearic acid resulted.

Later, the action of nitric acid on hydroxy-stearic acid was dealt with, and a fine yellow crystalline compound was obtained having a melting point of 82° C. This compound was an acid, and from it a number of derivatives were prepared and analysed, but the authors had obtained contradictory results which at the moment cannot be so far reconciled as to enable them to construct a constitutional formula for this yellow compound. One thing, however, was quite certain, that the substance did not contain nitrogen, and in this connection some interesting experiments were described, showing how the ordinary method of analysis was liable to show the presence of nitrogen when in reality no nitrogen was in the compound. In this connection reference was made to a paper published by the United States Bureau of Mines on the determination of nitrogen in coal by Fieldner and Taylor, who showed that both fine and coarse copper oxide, when partly reduced and re-oxidised in air, retain nitrogen which is not completely removed at room temperature by evacuation and replacement with carbon dioxide. Such an oxide gave considerable quantities of nitrogen when heated alone, as in the Dumas method for the determination of nitrogen.

It was concluded that the errors which had occurred were explained by this research, and the absence of nitrogen in the yellow compound was further confirmed by the usual qualitative tests. The yellow crystals were studied in some detail, and proved to have a molecular weight, by the Landsberger-Walker-Lumsden method, of the order of 276, while chemical methods based on the supposition that the acid was monobasic gave quite different molecular weights. Other usual methods gave such varying results that no definite conclusions could be come to, though from the analysis of various salts a molecular weight of 291 appeared to represent the acid. The esters, such as the methyl and ethyl, were made and described, but it was explained that as one of the authors was obliged to discontinue the work it had been presented in this unfinished state.

The authors conveyed their thanks to the Society of Dyers and Colourists for the monetary grant which had rendered the work possible.

The Multiplicity of Synthetic Dyestuffs

Standardisation of Nomenclature and Materials Urged

AT the meeting of the Chemical Section of the Manchester Literary and Philosophical Society, held on October 27, Mr. L. E. Vlies, F.I.C. (chairman of the Section) gave a short address on "The Multiplicity of Synthetic Dyestuffs." After one or two brief historical digressions the author introduced his main theme, which took the form of a question—namely, Is there a real need for the overwhelming number of synthetic dyestuffs on the market? Mr. Vlies quoted import statistics for 1913, which listed over 10,000 different coal tar dyestuffs, and compared them with Schultz' tables of about the same date, in which only 900 different chemical compounds are described. Thus all the independent marks or brands were in most cases obviously simply slight variations from definite chemical types. He objected to the use of a special pseudo-scientific nomenclature by independent manufacturers.

Mr. Vlies put forward certain suggestions to explain the multiplicity. Thus of each class of colour dyers demanded a range covering the spectrum. In several classes—*e.g.*, the developed and vat class, a complete range was not available, and dyestuffs manufacturers were busily pursuing research in order to fill up the gaps. He instanced that as justifiably increasing the multiplicity. Again, he could understand the need for a large number of chemically almost identical products differing slightly in other properties than colour, in view of the varying demands of colour users, who were by no means all dyers. But he lamented the fact that mixtures were made up for special requirements and sold under independent names, and he doubted the need for, for example, 27 direct cotton blacks, all chemically different compounds which appeared on the market under 487 different marks or brands.

A brisk and discursive discussion followed, in which it was pointed out that dyestuff users, in spite of the fact that many were not chemically trained, were the ultimate court-of-appeal, and that they often found differences between various brands which to the maker would not be apparent, but which to them were very valuable. It was also suggested that the cause of part of the multiplicity lay with the makers themselves, who in many cases did not put out pure chemical compounds, and of necessity had to denote varying degrees of purity by different labels. All agreed, however, that there were too many names in use, that standardisation was necessary, first of all in nomenclature, then in the materials themselves. Improved control on scientific lines, in which users must take a part, was strongly urged.

Chemical Industry Club Dinner

As previously announced, the annual dinner of the Chemical Industry Club will be held on November 24, at the Connaught Rooms. Among the probable speakers are Lord Riddell, Sir Harry McGowan, Sir William Pope, Mr. Roscoe Brunner, Professor F. G. Donnan and Dr. E. F. Armstrong.

Institute of Chemistry

The Registrar on Future Prospects

THE address of Mr. R. B. Pilcher (Registrar of the Institute of Chemistry) on "The Present Position and Future Prospects of the Institute and the Profession," to the Huddersfield and Leeds Sections of the Institute, on October 23 and 24 respectively, was, he said, intended to provide material for debate. He compared the position of the Institute with its position in the past, having regard to the services which it rendered to the community, and compared it also to that of similar bodies. The chartered professional institutions generally had become recognised as part of the machinery of the State; they supplied the hallmark whereby the trained practitioners in any profession could be distinguished; they exercised greater influence and now received greater recognition from the community than at any time hitherto. They existed for the public service; but their most valuable work lay in upholding the status of their professions, while each individual member reaped the benefit of being acknowledged by his own professional body as a whole. The result in the case of the Institute was the establishment of an organisation of nearly 4,000 members with a very high standard of professional competency and integrity, an organisation which had rendered the country good service and of which every member had good reason to be proud.

Prestige of Chemists

It had throughout striven for high ideals and high standards, and would continue to be a factor in preserving the prestige of chemists and promoting their highest interests. It had extended its activities beyond those of many similar bodies, and not the least important move had been the establishment of local sections. In the eye of the public the Institute and the profession had still to contend with a misunderstanding as to the use of the word "chemist," but he thought that progress had been made in that matter, not so much with the man in the street as with the people who counted. Chemists were coming into their own title by the natural process of assuming it. They could not take any other; but they would secure it as the public learned more about them and their work.

The position of a profession, Mr. Pilcher said, might be gauged by the extent to which it was employed. After the war chemists were in demand, and at the end of 1920 only thirteen members of the Institute were known to be without employment. It was remarkable, in view of the very large increase in the number of recruits to the profession, the depression in industry, and the closing down of works—that the number of members now without appointment was not greater. Still, there was a surplus of about 130, or less than 3 per cent., and he asked for the help of members of the sections in making an endeavour to find them work.

Attitude of the Public

Continuing, Mr. Pilcher said he thought it unwise and hurtful to cry down the profession and to complain that it was not recognised as it should be. Chemists were comparatively few in number. The organisation of their profession was comparatively recent, and their work was less obvious and, indeed, often secret. For these reasons, they were not so much in the public eye as some other professional men; but people began to realise more and more how much they were indebted to chemists. Chemists should welcome all suitable opportunities of letting other people know who they were and what they did. Compared with other professions, the training for chemistry was as prolonged, the order of intellect required was higher than for most, the services rendered (so far as they could be compared) were as valuable, and the strictest code of professional procedure was observed. The high tone of the profession was a sure index of progress.

The mountebank—who promised a good report for advertisement purposes before he received the sample—had disappeared, but practitioners had still to contend with competition from trading concerns and state-aided institutions beyond the control of the censors. At the same time, there was less interference from other professions; perhaps the advance of chemical methods placed the work beyond their capacity.

In recent years there had been a great increase in the number of young men and women capable of routine testing; but such work had a limited value, and could not afford satisfactory prospects for highly-trained men. The remuneration should be proportional to the services rendered; therefore only those who were capable of the highest services could reasonably expect the highest reward. If chemists were to take a more prominent part in industry there should be a constant supply of chemists who were men of affairs as well as chemists. He thought, therefore, that more chemical students should be encouraged to take training in the principles of engineering, and some at least to acquire experience in commerce. He knew that this would be held by some to be impracticable, and he was far from advocating over-training, which led to exhaustion; but he suggested that engineering could be taken more frequently as an optional subject and that if chemists were to replace what might be termed by some as "rule of thumb" men, and by others as "practical" men, it would be necessary for them to acquire something of the good and useful qualities of the latter. He constantly told students that they must be brilliant to be very successful. He could not deter the new recruits and could only conclude that the young man bent on science is not out for fortune but for higher aims.

Broader Training Desirable

Chemistry was a calling requiring several grades of ability. It was impossible to prevent the influx of men of lesser attainments, of whom there was always a certain definite need. The most they could do was to urge employers who required the services of such assistants to take only those who had the necessary general education as well as the earnest intention of becoming properly qualified. He was not convinced that compulsory registration, if it were possible, was yet desirable, except for certain special purposes, or that it would be wise on general grounds to hedge round with legislative restrictions the pursuit of science any more than the pursuit of art or music. He hoped to see the more complete organisation of qualified chemists under the Institute combining the professional spirit with the spirit of fellowship, much of which he feared would be lost if and when the profession passed under more strictly bureaucratic control. He suggested that the local sections should devote special attention to the interests of the coming generation. He also referred to the importance of maintaining a stable chemical industry, without which there would be little work for chemists, and a consequent reaction on the progress of the science of this country. In industries which were essentially chemical, chemists were now more frequently found among the directors or as managers, but there were many other concerns less chemical in character which might with advantage employ chemists in the works or as consultants.

Professional Fellowship

In conclusion, Mr. Pilcher expressed the opinion that the position of the Institute was sound and was steadily improving in every way, but to maintain that improvement members generally must take their share in its affairs and keep alive the spirit of professional fellowship. The position of the profession was far more satisfactory than at any pre-war period, and, but for the surplus which should be absorbed without great difficulty as conditions become more normal, the future was very promising. The coming generation must realise, however, that a chemist was not equipped for the business of life unless, in addition to his chemistry, he could bring a practical mind to bear on the needs and importance of those whom he served.

The chair at the Huddersfield meeting was taken by Dr. H. H. Hodgson, and the following members took part in the discussion: Messrs. Webster Moss, H. T. Lea, G. B. Jones, Dr. J. Bruce, H. S. Foster, S. Robson, Dr. A. E. Everest, and Dr. L. G. Paul. At Leeds, Mr. W. McD. Mackey was in the chair, and those who took part in the debate included: Dr. R. B. Forster, Messrs. F. W. Richardson, J. A. Foster, F. W. Branson, Robert Gawlor, B. A. Burrell and George Ward.

During his tour in Yorkshire, Mr. Pilcher visited the University of Leeds, the Huddersfield Technical College, the Bradford Technical College (where he addressed the staff and students of the Chemical Department), and the Central Technical School at Leeds.

Legislation in Chemical Industry

The Safeguarding Act and Fine Chemicals

At the opening meeting of the session of the Northern Polytechnic Institute Chemical Association, held on October 24, Dr. R. S. Clay, principal of the Institute, in the chair, Mr. W. J. U. Woolcock, delivered his presidential address on "The Effect of Legislation on Chemical Industry."

After explaining the objects of legislation and how it is effected, Mr. Woolcock considered at some length the Alkali Works Regulation Act, 1906, the Smoke Abatement Bill, the Dyestuffs Act, and the Safeguarding of Industries Act, as illustrating the effect of legislation on chemical industry. Dealing with the former he outlined its provisions, and pointed out that the really interesting fact about the Act was that the industry had to pay for the pleasure of being inspected. He mentioned this Act not only because it affected chemical industry, but it was one of the very few examples of legislation on behalf of the whole general community paid for by a small section of that community. The alkali inspectors as a body of men had, however, carried out their duties in such excellent fashion and had in some cases been so useful, that they were very much liked in the industry.

Mr. Woolcock characterised the Smoke Abatement Bill as an example of half-hearted compromise, perpetuating a system which had grown up of legislation by reference; altogether it was a wretched little Bill. Obviously, chemical industry could not sit still and allow a Bill of this kind to pass unchallenged. It quietly included in the definition of the word "smoke," "soot, ash, grit, and gritty particles." Among other things it gave power to the Minister of Health to increase the already long list of substances which came under the Alkali Act without further legislation.

Passing on to the type of legislation which was passed to benefit some particular industry because of the indirect benefit which it was hoped would accrue to the general community, Mr. Woolcock cited the advantages and disadvantages of maintaining essential industries, such as chemicals and dyes, by means of a subsidy, a tariff, or prohibition, and gave a brief account of the legislation following the findings of the Committee on Commercial and Industrial Policy, and culminating in the passage of the Dyestuffs and Safeguarding of Industries Act.

Effects of the Safeguarding Act

It might very properly be asked, continued Mr. Woolcock, why, if the system of prohibition of import except under licence was used in the case of dyestuffs, a different system was adopted in the case of fine chemicals. The main reason, he thought, was that in the one case there was a multitude of consumers of fine chemicals, while in the other the colour users were a compact body. The method of the Safeguarding of Industries Act was simple, and it made no distinction between fine chemicals which were made in this country and those which were not. That was one of the disadvantages of the Act, but it must not be forgotten that it was the fine chemical industry which it endeavoured to protect, and not the manufacture of certain fine chemicals which happened to be made here at present. It was difficult to estimate the effect of this Act on the fine chemical branch of the industry, as the issue had been somewhat obscured by the old Free Trade and Protection controversy, but, judging from the reports of British fine chemical makers and from the vigorous opposition of those whose living depended on the sale of foreign chemicals, it seemed safe to say that the Act had contributed materially to the establishment of the industry here.

Co-operation of Makers and Consumers

The Dyestuffs Act, continued Mr. Woolcock, was a most interesting Act, typically British in its construction, and breathing the spirit of compromise in every line. In theory the method adopted was, in his view, the fairest which could be devised to assist an industry, but the difficulties in practice could only be got over by a very close working together of makers and consumers. The problem in administration was what should we bring into the country, and why? The determining factor was what the consumer required, but the reason for passing the Act was to establish the dyemaking industry here; the real object therefore was to establish the industry without placing the consumer in an unduly disadvantageous competitive position. The list of dyes which were being made here in sufficient quantity and of the right quality was a much larger one than was generally supposed, but there were still a great number of dyes required by the textile trades which were not at present, for various reasons, made in this country.

In conclusion, Mr. Woolcock observed that the chemical industry was not one which could be carried on in any place, at any time, without any inconvenience to the public. It, therefore, had to submit to a certain amount of control and inspection in order that it might not become a nuisance to the general public. It was the key industry of the world; there was no other industry which could be carried on successfully without it, as it entered in greater or lesser degree into all of them.

Unsuccessful Manufacture of "Westrumite"

Mr. Henry James Buckmaster, of 26, Victoria Street, London, S.W., who had been interested in the manufacture of a bituminous material (called Westrumite) was adjudged a bankrupt on May 31 of last year, and he applied to Mr. Registrar Hope at the London Bankruptcy Court on October 25 for his order of discharge. In reading his report on the application the Official Receiver said that the trustee in the bankruptcy had admitted proofs of debt totalling £55,205 and had stated that further proofs amounting to £125,107 would probably be admitted, in which event the total of the unsecured indebtedness would be £180,312. The assets, which were estimated to realise £35,592, had actually produced £735; while the sum of £475 had been recovered from other sources, but nothing further was likely to be received. Continuing, the Official Receiver said that the debtor became interested in Westrumite in 1908, the material then being manufactured in the U.S.A. and Canada and at Antwerp. He bought for £2,000 a one-third share of the net profits of one of the American factories from the inventor, who agreed to supply the material from Antwerp for the purpose of its being used in this country for experimental purposes. In 1913 he verbally agreed with the inventor to accept for his share of the net profits £15,000, and it was afterwards arranged between them that in lieu of that amount and in consideration of services rendered in exploiting the material and of his undertaking to pay certain liabilities of the inventor, he should receive one-third of the share capital of a company to be formed with a capital of £300,000 to acquire the British patent rights of the process. In August, 1913, the debtor, in conjunction with another person, formed the Westrumite Asphalte Co., Ltd., of which he became director and which bought the British rights in the process for £18,900, payable as to £9,690 in debentures and as to £9,210 by the allotment of shares, and the debtor received 100,000 shares of 1s. each. The intention was that a factory should be erected and contracts for the supply of the material entered into, and when the business was in full operation that the capital of the company should be increased to £300,000 or that a new company should be formed. In July, 1914, the company having erected and equipped a factory at Fulham, entered into provisional contracts for the supply of material, which it began to manufacture, but the business came almost to a standstill on the war breaking out. The debtor attributed his position mainly to the war having prevented the company from fulfilling the provisional contracts, which would have resulted in his interest in the company becoming of considerable value. The Official Receiver, however, said that in his view the debtor's insolvency was chiefly due to rash and hazardous speculation and to unjustifiable extravagance in living. The application was opposed by counsel on behalf of the trustee in bankruptcy, and also by the Official Receiver in company's liquidation in his capacity of a creditor. The Registrar also heard counsel in support of the application for the debtor and then reserved judgment.

Institute of Chemistry Pass Lists

The following candidates have passed the examination for the Associateship of the Institute of Chemistry. In general chemistry: Guy Chignell, B.Sc.Lond. (Southampton), Herbert French (Edinburgh), Francis Eric Wild, B.Sc.Birm. (Birmingham), Edward Bernard Young, B.Sc.Lond. (London). In branch (*d*) organic chemistry (under regulations in force prior to March, 1920): Noel Gregory Baguley (Nottingham), Frederic Cole (Nottingham).

Wintergreen Oil Distillation

Native American Practice Described

In an article in *Ungerer's Bulletin*, Mr. M. G. Teaster states that the distillation of oil wintergreen is one of the native American essential oil industries, as the true oil is not produced outside the United States. In America it is produced from the leaves of *Gaultheria procumbens*, a plant which grows wild in many parts of the North American continent. A large proportion of the oil wintergreen leaves, however, is distilled in the mountains of western North Carolina, eastern Tennessee and south-west Virginia and West Virginia.

The distillation is carried out on a small scale by some of the natives who collect the leaves and distill them in crude home-made stills, but for the most part the pickers sell their leaves to larger distilleries. Freshly picked leaves are carried to the distilleries in carts, wagons, on horse-back and mule-back, and it is no unusual sight to see pickers transporting their leaves in huge sacks slung over their shoulders. The most common distillery is a rather crude affair in which the still consists of a wooden vat fitted with a sheet-iron bottom and having a capacity of from 600 to 1,000 lb. of leaves. This still is fitted on a primitive furnace constructed from flat rocks, clay and mortar.

Arrangement of Plant.

The distillery is invariably located near the mouth of a ravine or hollow from which flows a small stream which can be depended upon to furnish an adequate supply of water at all seasons of the year. Immediately beside the still is located the condenser box, either stationed on the ground or supported on trestles as the occasion demands. It usually contains at least three or four hundred gallons of water and has a considerable stream continually flowing through it. This condensing vat is fitted with a coil of iron piping of about one inch diameter and thirty feet long, which is connected at its upper extremity with the still head and at the lower protrudes from the condenser box near the bottom and drips into a can placed immediately below. The process, of course, is simple. Distillation goes on in the still and a mixture of water and oil vapours comes over to be cooled and condensed in the coil in the condensing box and collected in the can where the oil and water are separated. The stills are always provided with false bottoms made of wooden slats and are placed a few inches above the bottom of the still, the function of which is to prevent the leaves from coming in contact with the hot sheet iron bottom and becoming scorched, which would ruin the quality of the oil made during the run.

Period of Distillation.

The loading of the still is customarily done late in the evening and a slow fire maintained during the night, allowing the contents to simmer but not become too hot. A good fire is started early the following morning and distillation is continued for five or six hours. This period suffices to exhaust the oil from the leaves and the run is discharged at the end of this time. Then the still is allowed to cool until late in the evening when the new charge is put in and the process repeated.

As a rule the yield of oil wintergreen amounts to a little less than one per cent. of the weight of the leaves, usually fourteen ounces to 100 lb. of leaves; much, however, depends on the cleanliness of the leaves.

It is difficult if not impossible to estimate the yearly production produced in this Southern section on account of the large numbers of small distillers, but Mr. Teaster is of the opinion that the amount of genuine oil wintergreen leaves does not exceed a few thousand lb. This amount might be greatly increased, as the available supply of raw material is practically inexhaustible. There does not exist a dependable market, however, for any considerable quantity of this oil on account of the inevitable higher cost of production as compared with the almost identical oil sweet birch and the artificial methyl salicylate which is used in large quantities.

Methyl Salicylate Content

Oil from wintergreen leaves is composed almost entirely of methyl salicylate, the proportion being in excess of 98 per cent. It has a specific gravity which should always lie between 1·180 and 1·193 and a refractive index of 1·5350. It distills between 218 and 221° under normal pressure. The only factors which serve to distinguish it from oil sweet birch and methyl salicylate are its optical activity and a slight difference in flavour. Both methyl salicylate and oil sweet birch are optically inactive, while oil wintergreen leaves are laevo-rotatory to a slight extent, stated usually to be under 1 degree and given in the U.S. Pharmacopœia as 0·25 degrees. This can readily be attained by the addition of certain adulterants to the oil sweet birch, but the characteristic flavour and odour of true oil wintergreen is not so easy to duplicate, and expert discrimination must depend chiefly upon this characteristic. At best, however, detection of adulteration is unusually difficult.

A possible means of distinguishing chemically between oil wintergreen and the other similar products lies in the presence in the natural oil of a small amount of a hydrocarbon of high molecular weight, which has been identified as triacontane and contains thirty atoms of carbon and sixty-two of hydrogen. This same hydrocarbon is present in the oil from *Betula lenta* but to a lesser extent, and the greater amount present in the genuine wintergreen offers a means of differentiation if a simple chemical test can be devised which will show the percentage of this hydrocarbon present in a given sample of oil. Unfortunately, this problem is a difficult one owing to the practical impossibility of differentiating this ingredient of the natural oil from similar substances which might be added to methyl salicylate or oil sweet birch to simulate the same effect.

It has proved to be a serious handicap to those desiring to produce oil wintergreen leaves of absolute purity and genuineness that it has been so simple to make adulterated products of practically identical characteristics at much lower prices. But for this fact, concludes Mr. Teaster, the American industry of wintergreen distillation would be vastly more important than it is to-day.

German Chemical Industry

Costs of Raw Materials further Increased

According to a report of the Prussian Chamber of Commerce on the German Chemical Industry during September, forwarded to the Department of Overseas Trade by the Commercial Secretary at Berlin, the inland market for dyestuffs was satisfactory, although the situation of the chief consumert the textile industry, has become critical owing to the grea, fluctuations in the price of raw materials, the scarcity of mone,y and the diminished demand of the inland market. In many cases the orders in hand would be sufficient to ensure employment for weeks, and even months, to come, but the disparity between the amount of working capital and the prices which have to be paid for foreign raw materials compels restriction of work. Foreign sales were satisfactory. There is, however, very little prospect of a continuation of the unusual business activity; a reaction is feared at the beginning of the winter. The supplies of raw material were more difficult to procure owing to the continuous depreciation of the mark.

Soda and benzol in particular had to be imported in large quantities from abroad. The supply of rock salt and lime was frequently insufficient owing to the scarcity of trucks.

The practice of quoting offers in foreign values grows more frequent, as also does the demand for payment in foreign currency. The scarcity of capital and the possible further depreciation of money between the date of contract and the date of payment led to the introduction of more stringent conditions of payment in some cases, and to the demand for whole or partial payment in advance. Unpunctual deliveries became more frequent, and manufacturers often tried subsequently to increase the price of goods ordered, on which the customer was absolutely dependent.

The supply of fuel was wholly inadequate. Large quantities of foreign coal and coke had to be bought in order to keep the nitrogen and dyestuffs factories running. The necessity of burning different kinds of fuel made operations very difficult.

Prices of raw materials increased to an extent not yet experienced. For many kinds the price rose to 4—6 times the June price and 5—600 times (zinc dust 651) and even to 800 times the peace price—*e.g.*, in the case of benzol and cotton for filtering purposes. The business situation in the chemical industry is described as bad. Few orders were received and a holding back was observable in many cases in the part of foreign buyers.

Production of Alumina from Clay

Investigation of the Miguet Process

In recent years much interest has been centred on the possibility of producing alumina from clay, and proposed methods for the recovery of alumina are appearing constantly in patent literature. As a good grade of clay contains from 30 to 40 per cent. of alumina, the prospect of recovering it is alluring.

A patent typical of many projected thermal processes is that of Paul Miguet (U.S. Patent No. 1,376,563), in which the inventor proposes to prepare alkaline aluminate by fusing clay, lime and scrap iron with a reducing agent in the electric furnace, thereby reducing the silica and forming calcium aluminate and ferrosilicon. The calcium aluminate, being lighter, would float on top substantially free from foreign oxides. It could then be tapped off, cooled, and later crushed and leached with sodium carbonate solution to form, by double decomposition, sodium aluminate and calcium carbonate. The former is soluble and yields readily aluminum hydroxide. The ferrosilicon would be recovered as such and sold at a profit. The reactions are supposedly as follows :—

(1) $Al_2O_3 \cdot 2SiO_2 \cdot 2H_2O + Fe + 4C + CaO = FeSi_2 + 4CO + CaO \cdot Al_2O_3 + 2H_2O$.

(2) $CaO \cdot Al_2O_3 + Na_2CO_3 = CaCO_3 + Na_2O \cdot Al_2O_3$.

So many reactions similar to the above have been proposed, and it is so popularly believed that alumina can be obtained from clay by fusion, that the North-west experimental station of the U.S.A. Bureau of Mines at Seattle, Wash., undertook to investigate the Miguet process.

In a report just to hand Messrs. C. E. Williams and C. E. Simms state that the tests were carried out in a carbon-lined pit furnace of the Girod type, having a tap hole to remove the fused material. Clay containing 38 per cent. alumina, pure air-slaked lime, steel turnings, and gas-retort carbon were used. These materials were finely ground, intimately mixed, wetted, and dried in lumps to avoid dust. In the first tests the charges were made up with clay, lime, iron and carbon in theoretical proportions according to the Miguet patent. The charge melted down readily, and when melted was tapped. The analysis showed only a slight reduction of silica, and it was thought that possibly insufficient time had been allowed for reduction. The test was therefore repeated, the charge being held molten for a considerable time before tapping. No increase was noted in the amount of silica reduced. When the product was crushed and leached with a hot concentrated solution of sodium carbonate, only a trace of alumina and fully as much ferrous iron was found in solution.

When the proportion of lime was increased, it merely increased the melting point and gave no better product. In these first tests an effort was made to keep within the limits of commercial practicability, but, having failed to obtain any favourable results, these restrictions were cast aside and tests were made to determine what was technically possible. The proportion of lime, carbon and iron to clay was increased to speed up their action on the clay, and the charge after fusion was heated to 1,800° C. and held for 30 minutes. Still results were unsatisfactory. A charge was then made up with carbon three times and iron twice the thecretical quantity. The purpose was to subject the charge to the most intense reducing conditions possible, and silica is known to reduce more readily in the presence of iron. The charge was melted with the furnace over-powered to such an extent that dense fumes arose. The product obtained was black and stony—hard enough to scratch glass easily. On examination, it was found to contain carbides of calcium, aluminum, and silicon, sillimanite, and quantities of a glassy substance. The analysis showed that about 40 per cent. of the silicon had been reduced and alloyed with the iron. The product of this final fusion, when leached with sodium carbonate, gave a recovery of about 30 per cent. of the alumina.

The fact that alumina was actually produced gives some small basis for the claims of the patent, but the prospects of its successful applications are extremely poor. In the first place, to produce alumina by the method of the most favourable test, the cost of the material alone would be more than $300 per ton, as the minimum figure. Moreover, there is no proof that calcium aluminate was formed, because, with so much carbide present, it is just as likely that the sodium aluminate obtained was formed by the decomposition of aluminum carbide and its subsequent solution in the sodium carbonate.

Naphtha Production of Baku

According to the *European Commercial*, the June output of naphtha in Baku reached 15,519,000 poods. In comparison with the May total, the output showed a decrease of 10·1 per cent. If, however, one takes into account the periods of production (30 days in June against 31 in May) the decrease for June amounts to only 7·1 per cent. This decline is almost entirely due to the diminishing of the petroleum springs.

The following figures show the total output, by the various methods, for the two months under comparison :—

In thousand poods.

1922.	Baling system.	Pressure pumps.	Springs.	Totals.
May	7·985	6·212	2·240	16·437
June	7·562	6·068	1·154	14·785

The quantity used in the process of production itself during the month amounts to 1,885,000 poods, which is 12·8 per cent. of the total quantity, against 12 per cent. in May.

In contrast with the increase up to May in the number of sources being exploited, June shows a backward tendency. The average number of sources being worked daily in May was 1,212 and in June only 1,170, the reason of the decrease being in the first place the lack of several materials necessary to the work and, in the second place, insufficient means of exchange, whereby the work of production was rendered more difficult.

Claim for Injuries from Acetic Acid

In the Mayor's and City of London Court, on October 30, before Deputy Judge Shewell Cooper, David Gaffney, labourer, made a claim under the Workmen's Compensation Act against W. H. Muller and Co., Ltd., merchants, Holland House, Bury Street, for compensation for an accident that happened on October 1, 1921, on the s.s. *Batavier*. Mr. Thessiger appeared for the plaintiff, and Mr. Howard for the defendants. Mr. Thessiger said that on October 1, 1921, plaintiff was discharging bottles of acetic acid when a bottle burst and the acid burned his leg. He was taken to hospital and treated there and went home. His leg became septic and he was sent to Southwark Hospital, where he was an inpatient for seven weeks. He was paid compensation at the rate of 35s a week. On February 21 the employers wrote and said they could not continue to pay 35s., but that they would pay him £1 a week. He refused that and his case was that he was still totally incapacitated. He was incapacitated from even doing light work. Mr. Howard said that the plaintiff could have done his ordinary work on February 21 last. Dr. Gardiner, who was called for the defence, said that having examined the plaintiff he formed the impression that he was perfectly fitted to do ordinary heavy work on June 1. He really thought he was fit as far back as February. The Deputy Judge said he would allow plaintiff 35s. a week up to March 6, less payments made of 20s. a week to June 1, when compensation would cease. The plaintiff would have his costs.

The De-Watering of Peat by Pressure

A paper on the above subject will be read in the Smoking Room of the Chemical Industry Club, 2, Whitehall Court, London, S.W.1, on November 10, at 8 p.m. Everyone interested, whether a member of the Club or of the Chemical Engineering Group, will be cordially welcome. Many attempts have been made to utilise the vast peat resources of the Empire and the world, and up to the present, no process has appeared to supplant the old-fashioned air-drying method. The paper, the author of which is Professor J. W. Hinchley, deals with a method of reducing the water content of peat by mechanical means, and will be illustrated by quantitative data, diagrams, slides and samples. Everyone who can contribute to the discussion, or is interested in the subject, will be cordially welcomed to the meeting. Dinner and other refreshments will be available to members of the Club only. The chair will be taken at 8 p.m. by Mr. J. Arthur Reavell, chairman of the Chemical Engineering Group. Further details of the paper, including an abstract of its contents, will be forwarded to members of the group in the ordinary way, and non-members can obtain similar information by enclosing a stamped addressed envelope with their application to the Hon. Secretary, Chemical Engineering Group, 24, Buckingham Street, Strand, London, W.C.2.

Labour's Move to the Left

By Sir Ernest J. P. Benn, Bart.

THE contents of the official Labour Party Election Programme is a matter of genuine regret to that great body of enlightened industrial opinion which had begun to look forward to a period of greater wisdom in all those matters which concern the relations between employers and employed, and the welfare of the community as a whole. Some of us were hoping that in recent years sufficient evidence had been accumulated of the change of outlook on the part of the employing classes to render unnecessary a retention by the wage-earners of all those Marxian theories which were the direct product of the lack of knowledge and foresight of the captains of industry of the early Victorian period.

Now an election is suddenly thrust upon us, and with a callous disregard of all the progress of the last six years, the Labour Party takes a sudden move to the left and makes it necessary for every true friend of Labour to oppose with all the force at his command the return to Parliament of any Labour candidate who may present himself. Nine-tenths of the official Labour programme could be accepted without much hesitation by the average elector. But there are two specific and definite proposals in the Labour Party programme which are so impossible, and so destructive, that all sane men and women are perforce driven to discard for the time being every suspicion of a conciliatory attitude, and to put the whole of their energy to the defeat of any candidate who calls himself a member of the Labour Party. The Capital Levy, coupled with the reiteration of the "right to work or maintenance" are two proposals either of which would bring civilisation to an end.

The Capital Levy

If it were true that by means of a Capital Levy the National Debt could be written down to reasonable proportions, taxation could be brought back to a moderate scale, and trade prosperity could be assured, then none of us would object to a Capital Levy. The attempt to show that this can be done is the most dishonest manœuvre in the present political campaign. Dismissing Mr. Sidney Webb's new-found solicitation for the welfare of the capitalistic class, there still remains a big body of uninformed opinion which is attracted by the simple arithmetic of the advocates of the Capital Levy. There is a sort of superficial justice in the idea that the millionaire should write a big cheque and that the Chancellor of the Exchequer should apply the proceeds to the reduction of the National Debt. Every one of us is attracted by the idea of extracting from the tradesman who has in recent years fattened on our necessities some of his ill-gotten gains, so that our rates and taxes may be reduced.

Splendid Electioneering

Happily in this matter of a Capital Levy, we have not only the argument and the theory of the matter, but we are fortunate in possessing the actual experience of other people and are able to demonstrate from the happenings of our own time exactly what the proposal involves. It is worse than useless to attempt to defeat the Capital Levy by whining about confiscation. The proposal is put forward with such cunning that the confiscation line of argument is not calculated to appeal. It is only proposed to touch those amongst us who are the happy possessors of five-thousand pounds' worth of property. This is splendid electioneering, because, of those who will drop the fatal ballot papers in the box, it is safe to assume that not more than one in a thousand is the possessor of anything like this sum of money. Most people would take the view that if it were possible to benefit the whole community, if it were feasible to rid the nation of an intolerable debt by some enforced sacrifice on the part of one man out of every thousand of us, then the thing should be done. The newspapers, therefore, which are crying out about confiscation are really strengthening the case for the Capital Levy, rather than doing anything to defeat it.

The real fact is that you cannot confiscate Capital on a large scale in this way; the Capital refuses to be confiscated, it simply disappears. One or two simple illustrations are sufficient to demonstrate this.

Consols at 40

If the public were of opinion that the Labour Party was really likely to win the coming election, and that a Capital Levy would be put into force, several things would happen at once. To begin with, War Loan would drop to eighty, and Consols would be marked round about forty. The red-tied agitator would represent this as a capitalistic dodge, but in point of fact it would be nothing but the natural workings of the common instinct of self-preservation which no Labour Party can eradicate from the human composition. The holders of War Loan or Consols could not be prevented, nor could they be blamed for endeavouring to convert their property into some form where it would be less exposed to danger. Some of them might be tempted to adopt the German habit of sending it abroad. Years of skilful regulation and restriction on the part of the German Government, goaded and assisted by all the financial experts of the world, have failed to stop the workings of this natural process, but if we assume that Mr. Sidney Webb and the intelligentsia of the Labour Party are cleverer than all these people, and could devise means which would prevent the export of British capital, that does not dispose of the difficulty. The mere threat from responsible quarters of a Capital Levy would be sufficient to promote an orgy of spending and wealth-wasting, such as has occurred in Austria and Germany during the last three years.

The Capital Levy has been tried in Austria and has failed. Austria should be studied more closely and its experience made more freely available for political students everywhere. Austria differs from Russia only in that it has not renounced Capitalism. The various forms of socialistic government which have succeeded the monarchy have tried, as would the English Labour Party, to work the communistic programme on a basis of capitalism; they have now reached the point where the lowest form of labour receives in wages £25,000 a week; wealth in terms of money has been distributed on a scale unprecedented in history, and the art of arithmetic has been stretched to its limit, but the Millennium has not arrived.

The Right to Maintenance

The second point in the Labour Party programme, which forces upon some of us, all unwillingly, the need to put every ounce of effort which we possess into the fight against Labour, is the seductive but preposterous demand for work or maintenance. In a well-ordered social community, built upon sound capitalistic lines, and administered with due regard to human considerations, it is not only desirable, but it is possible, to make such arrangements that those who fall by the way in the struggle for existence which is the natural lot of man, should be treated with consideration, and have some provision made for them. Life is a struggle, and will never be anything else for any of us; but it is some consolation to know that if in that struggle our powers should fail us, our fellow-creatures have become sufficiently civilised to be relied upon to extend a helping hand to us. But if we are now to absorb the theory that whether we work or not we must live, those who hold that the end of the present civilisation is in sight are completely justified. The work or maintenance theory is already having its effect. It has reduced our railways and our postal service to a state of efficiency which is well below the pre-war level. It has brought us to a condition when it is almost impossible to secure anything up to pre-war quality.

But without indulging in abstruse argument, or reaching into the depths of philosophy, the work or maintenance idea can be tested by the simplest arithmetic. If one man in ten exercises his right to maintenance, the other nine may be able to support him. If two men in ten establish the same position, then the burden of maintenance falls upon the eight. When we reach the stage that nine men out of ten have maintenance by right, the proportions of the burden upon the one become apparent, and it would not be long before he himself would find the position intolerable, and the whole society would collapse. Nothing in political history, not even the War itself, has ever possessed one tithe of the destructive possibilities of this insidious, unmanly, dishonest, idea of work or maintenance. It is the cocaine evil applied to the realm of economics.

If either of these proposals would accomplish anything useful, if they would lighten the lot of the worker, or strengthen the social fabric at any single point, then some of us would be only too glad to reconsider our position. But as both are wholly and exclusively destructive and can do nothing but accentuate the difficulties which they are designed to remove, there is no alternative for good citizens but to offer the most strenuous opposition to them.

From Week to Week

RUMOURS were current in London on Thursday to the effect that an important nitrate issue is pending.

A DINNER to honour Professor H. B. Dixon will be held in the Midland Hotel, Manchester, on December 8.

ENCROACHMENTS of the sea at Spittal Point, Berwick, are said to be endangering three large chemical works.

H. S. LOVELL AND CO., manufacturing chemists, announce their removal to 81-81A, Rosebery Avenue, London, E.C.1.

FURTHER INCREASES in the price of calcium carbide have been approved by the German Carbide Syndicate, with effect, from October 11.

MR. EDWIN THOMPSON, managing director of Thompson and Capper, Ltd., has been nominated for re-election to the Liverpool City Council.

THE STRIKE at the refineries of the Burmah Oil Co., Ltd., at Rangoon, ended on October 27, the workers agreeing to resume work immediately.

A PROLONGATION of the concession to the Nitrate Railways Co. until 1972, with a provision for an increase of 35 per cent. in tariffs, is said to have been approved.

MR. A. MACDONALD, of John Poynter, Son, and Macdonald, chemical manufacturers, Glasgow, and Mrs. Macdonald, have recently celebrated their golden wedding.

ENGINEERS of the U.S.A. Bureau of Mines are said to have devised a method of distilling clay in a manner similar to that employed in the distillation of coal.

IN A MANIFESTO issued by the Indian Rubber Manufacturers' Association, strong objection is made to the rubber restriction scheme of the Stevenson Committee.

AT A MEETING of the French Cabinet in Paris it was decided in the interests of French agriculture to include nitrogenous fertilisers in the reparations in kind due from Germany.

MR. JAMES COCKRILL, who has represented A. Wander, Ltd., manufacturing chemists, London, in the North of England for some years, has resigned his position owing to ill health.

IN CONNECTION with the Chemists' Exhibition which opens in Manchester on November 20, it is announced that the available space at the City Hall is now almost entirely allotted.

AT THE MEETING of the proposed Association of Manufacturers of Non-corrodible and Anti-corrosive Products, held in London on Tuesday, it was decided to take steps to form an Association.

AN INDIAN FIRM is reported to have been experimenting with the manufacture of caustic soda from soap sand, which occurs in large quantities in Upper Burma. Preliminary results are said to be successful.

ANNOUNCEMENT is made that the legislation necessary for giving effect to the Colonial Office scheme for restricting the output of rubber has been passed by the Straits Settlements and the Federated Malay States.

SIR ROBERT HADFIELD has offered to contribute a sum of £50 per annum for three years to the British Association for the purchase of books for those who are engaged in scientific pursuits and are unable to purchase for themselves.

SAMPLES OF ORE from the copper area recently discovered in the Vesterbossö Province of Sweden are stated by the Director of the Swedish Geological Research Department to be of better quality than any previously found in Scandinavia.

BETTER CONDITIONS now prevailing in the Chilean nitrate industry were attributed by Mr. R. J. Hose, at the annual meeting of the Anglo-South American Bank, Ltd., almost entirely to the wise policy of the Chilean Nitrate Producers' Association.

THE FOLLOWING DEGREES have been awarded by the Senate of the University of London :—D.Sc. (Physics), S. Datta and F. C. Toy ; D.Sc. (Chemistry), S. S. Bhatnagar and H. Moore. The B.Sc. with second class honours in chemistry is awarded to B. O. Ashford.

IN VIEW of the general election, the President and Council of the Institute of Chemistry have very reluctantly decided to postpone the 45th anniversary dinner which was to have been held on November 17. Announcement of the new date will be made in due course.

AN INCREASE in membership is a noteworthy feature of the second annual report of the British Chemical Plant Manufacturers' Association. Investigations into the use of nickel for chemical plant have led to the conclusion that this metal is satisfactory for use in the construction of small vessels.

THE FIRST MEETING of the London Section of the Society of Chemical Industry will be held on November 6, at the Engineers' Club, 39, Coventry Street, London, W.1, at 8 p.m. Dr. E. F. Armstrong, F.R.S., president of the Society, will deliver an address on "Some Problems in Chemical Industry."

IN ORDER, it is stated, to prevent the control of the German dye industry from falling entirely into the hands of foreigners, the German Dye Trust has ruled that the preference stock, which is distributed amongst members of the trust only, will have ten times the voting power of the new six billion mark issue.

M. DE MAZARIN, a French metallurgist, is reported to have discovered an alloy to be called "oreum," which resembles gold in appearance, weight and durability. It is able, it is claimed, to withstand the action of corrosive gases and acids. The formula is to be placed at the disposal of the French Government.

IT IS ANNOUNCED that the present minimum wage of 1s. an hour and 1s. 2d. an hour for shiftmen in the chemical industry has been stabilised until December 31. A meeting of the Joint Industrial Council for the industry will be held in December to discuss further stabilisation or alteration of wages.

DURING HIS STAY in Wilmington, Del., Mr. F. E. Hamer (editor of THE CHEMICAL AGE) visited the du Pont works. He was also conducted over the Chemical Warfare Plant and was present at a special demonstration of the latest chemical warfare devices by Brigadier-General Fries, Chief of the U.S.A. Chemical Warfare Service.

H.M. MINISTER at Athens has forwarded a copy (in French) of a report on certain emery mines situate in the islands of Naxos and Syra. The report can be inspected by United Kingdom firms interested on application to the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1, quoting the reference number 7246/F.E.

IN THE LIGHT of correspondence alleged to have passed between the Badische Anilin und Sodafabrik and a Mr. Huret, the Yorkshire *Evening News* claims to justify the assertion, contradicted some time ago, that a business arrangement exists between the Badische Co. and the Compagnie Nationale de Matières Colorants et de Produits Chimiques.

A NEW BUREAU under the University of London Trust has been opened at 46, Russell Square, London, W.C.1, for the assistance of external students for the University Commerce Degree. Students in the provinces, and elsewhere, reading for this degree who cannot attend suitable colleges or classes are invited to communicate with the secretary, Mr. H. J. Crawford.

SPEAKING at the annual meeting of Lawes' Chemical Manure Co., Ltd., Mr. E. G. Cubitt (chairman), said that the trade outlook was not as bright as it might be, owing to a recrudescence of the foreign competition in superphosphates, which is now more intense owing to the depreciation of Continental currencies. A scheme for the protection of their mutual interests had been adopted by United Kingdom super-phosphate manufacturers and their company was a participator in it.

A MARRIAGE was solemnised at St. John's Church, Leytonstone, on October 28, between Mr. Harold Talbot, general manager of the Welsbach Light Co., Ltd., and hon. secretary of the Chemical Engineering Group of the Society of Chemical Industry, and Marion Ada Pickles, daughter of Mr. and Mrs. C. A. Pickles, of Leytonstone, London. Over 70 guests were present at a reception at the Elliott Rooms, Leytonstone, when the health of the bride and bridegroom was proposed by Mr. Yates, chairman of the Welsbach Light Co., Ltd. The honeymoon is being spent on the south coast.

AT THE OPENING meeting of the Edinburgh and East of Scotland Section of the Society of Chemical Industry, held in Edinburgh last week Mr. W. A. Williams, vice-president in the chair, an address on "Some thoughts on the Training and Career of the Industrial Chemist," was delivered by Dr. H. E. Watt. The importance of a university or college training for industrial chemists was emphasised. The training in pure chemistry should be as wide as possible, specialisation in any particular branch to be left until the completion of the University course qualifying for a degree or Associateship of the Institute of Chemistry. Additional subjects of study should include mathematics, physics, and, if possible, biology.

References to Current Literature

British

DYEING.—Dyeing wool in fast colours. B. Wuth. *J. Soc. Dyers and Col.*, October, 1922, pp. 241–247.

On some important but overlooked properties of cotton, mercerised by means of sodium hydroxide or sodium chromite (alkaline chrome mordant). J. Pokorny. *J. Soc. Dyers and Col.*, October, 1922, pp. 248–250.

Further notes on the dyeing of acetyl silk. C. Raglan. *Dyer*, September 15, 1922, pp. 106–107.

Multi-colour effects in simple piece-dyeing. Part I. R. Cross. *Dyer*, October 15, 1922, pp. 146–147.

CATALYSIS.—A study of catalytic actions at solid surfaces. Part VIII.—The action of sodium carbonate in promoting the hydrogenation of phenol. Part IX.—The action of copper in promoting the activity of nickel catalyst. E. F. Armstrong and T. P. Hilditch. *Roy. Soc. Proc.*, October 2, 1922, pp. 21–32.

ELEMENTS.—The disintegration of elements by α particles. E. Rutherford and J. Chadwick. *Phil. Mag.*, September, 1922, pp. 417–432.

ESSENTIAL OILS.—The constituents of essential oils. L. G. Radcliffe. *J. Roy. Soc. Arts*; Part I., October 20, 1922, pp. 811–816; Part II., October 27, 1922, pp. 825–841.

United States

PYROGENIC REACTIONS.—Decomposition processes applicable to certain products of coal carbonisation. M. J. Bradley and S. W. Parr. Bibliography. *Chem. and Met. Eng.*, October 11, 1922, pp. 737–744.

The decomposition of amines in the vapour stage. F. W. Upson and L. Sands. *J. Amer. Chem. Soc.*, October, 1922, pp. 2306–2310.

METALLURGY.—Effect of temperature, pressure and structure on mechanical properties of metal. Z. Jeffries and R. S. Archer. *Chem. and Met. Eng.*, October 11, 1922, pp. 747–751.

GENERAL.—Handling the finished products of industry. Part V. G. L. Montgomery. *Chem. and Met. Eng.*, October 11, 1922, pp. 731–733.

ACIDS.—Sulphuric acid recovery in oil refineries. L. B. Skinner. *Chem. and Met. Eng.*, October 11, 1922, pp. 734–736.

Condensation of certain nitriles and various polyhydroxyphenols to form phenolic acids. W. D. Langley and R. Adams. *J. Amer. Chem. Soc.*, October, 1922, pp. 2320–2330.

CATALYSIS.—Catalysis of the formation and hydrolysis of acetamide by acetic acid. W. A. Noyes and W. F. Goebel. *J. Amer. Chem. Soc.*, October, 1922, pp. 2286–2295.

ORGANO-METALLIC COMPOUNDS.—The sulphur content of arsphenamine and its relation to the mode of synthesis and toxicity. Part III. W. G. Christiansen. *J. Amer. Chem. Soc.*, October, 1922, pp. 2334–2342.

Researches on selenium organic compounds. Part I. Synthesis of 2-methyl-4-selenoquinazolone, 2-phenylbenzoselenazole, and some derivatives of the latter. M. T. Bogert and Y.-G. Chen. *J. Amer. Chem. Soc.*, October, 1922, pp. 2352–2357.

OXIDATION.—The oxidation of isopropyl alcohol and acetone with potassium permanganate. W. L. Evans and L. B. Sefton. *J. Amer. Chem. Soc.*, October, 1922, pp. 2271–2283.

ANALYSIS.—Potassium dichromate as a standard in iodimetry and the determination of chromates by the iodide method. W. C. Vosburgh. *J. Amer. Chem. Soc.*, October, 1922, pp. 2120–2130.

The determination of lead in lead amalgam. M. G. Mellon. *J. Amer. Chem. Soc.*, October, 1922, pp. 2167–2174.

Electrometric titration of dichromate with ferrous sulphate. M. Eppley and W. C. Vosburgh. *J. Amer. Chem. Soc.*, October, 1922, pp. 2148–2156.

German

ACIDS.—The purification of naphthenic acids. F. Zernik. *Z. angew. Chem.*, October 13, 1922, pp. 566–567.

ELECTRO-CHEMISTRY.—The electrothermic processes of industry. Part I. B. Waeser. *Chem.-Zeit.*, September 21, 1922, pp. 845–847.

The determination of the electrometric end-point. E. Müller. *Z. angew. Chem.*, October 13, 1922, pp. 563–566.

METHANE.—Methane; properties, constants and use. J. Bronn. *Chem.-Zeit.*, October 12, 1922, pp. 926–927.

ORGANO-METALLIC COMPOUNDS.—Organic arsenic compounds. Part VIII. The action of cyanogen bromide on tertiary arsines. W. Steinkopf, H. Donat and P. Jaeger. *Ber.*, September 16, 1922, pp. 2597–2614.

Olefine magnesium compounds. Parts I., II., and III. W. Krestinsky. *Ber.*, September 16, 1922, pp. 2754–2774.

REDUCTION.—The reduction of lignin and carbohydrates with hydriodic acid and phosphorus. R. Willstätter and L. Kalb. *Ber.*, September 16, 1922, pp. 2637–2652.

The reduction of substituted salicylic acids. H. Weil, M. Traun and S. Marcel. *Ber.*, September 16, 1922, pp. 2664–2674.

Synthesis of pyrrolidine: reduction of pyrrol by catalytic hydrogenation. N. J. Putochin. *Ber.*, September 16, 1922, pp. 2742–2748.

The Kishner-Wolff method of reduction. Part II. E. Thielepape and O. Sprekkelsen. *Ber.*, September 16, 1922, pp. 2929–2939.

COMPLEX COMPOUNDS.—Cellulose copper compounds. K. Hess and E. Messmer. *Ber.*, September 16, 1922, pp. 2432–2443.

Lead acetato complexes. R. Weinland and R. Stroh. *Ber.*, September 16, 1922, pp. 2219–2225.

The constitution of basic lead salts. R. Weinland and R. Stroh. *Ber.*, September 16, 1922, pp. 2706–2718.

PHOTOCHEMISTRY.—Iron as a photochemical catalyser. Part I. The decomposition of potassium ferrocyanide by light. O. Bandisch and L. W. Bass. *Ber.*, September 16, 1922, pp. 2698–2706.

Photo reactions of *trans-* and *cis-* cinnamic acids. H. Stobbe and F. K. Steinberger. *Ber.*, September 16, 1922, pp. 2225–2245.

REACTIONS.—The Friedel-Crafts' reaction. H. Wieland and L. Bettag. *Ber.*, September 16, 1922, pp. 2246–2255.

The condensation of α-halogen-ketones with aldehydes. K. H. Bauer and F. Werner. *Ber.*, September 16, 1922, pp. 2494–2500.

The action of bisulphite on nitraniline. H. Weil and P. Wassermann. *Ber.*, September 16, 1922, pp. 2533–2542.

Miscellaneous

PHOTOCHEMISTRY.—Photochemical catalysis. E. C. C. Baly. *Rec. Trav. Chim. des Pays-Bas.*, September 15–October 15, 1922, pp. 516–529.

The photochemical formation of phosgene. M. Bodenstein. *Rec. Trav. Chim. des Pays-Bas.*, September 15–October 15, 1922, pp. 585–591.

VALENCY.—Positive and negative valencies. W. A. Noyes. *Rec. Trav. Chim. des Pays-Bas.*, September 15–October 15, 1922, pp. 557–560.

Free radicals. P. Walden. *Rec. Trav. Chim. des Pays-Bas*, September 15–October 15, 1922, pp. 530–556.

Contributions to the chemistry of free radicals and relating to the varying affinity of carbon compounds. W. Schlenk. *Rec. Trav. Chim. des Pays-Bas*, September 15–October 15, 1922, pp. 561–564.

GERMANIUM.—Germanium. L. M. Dennis. *Rec. Trav. Chim. des Pays-Bas*, September 15–October 15, 1922, pp. 565–568.

Germanium hydrides. R. Schenck. *Rec. Trav. Chim. des Pays-Bas*, September 15–October 15, 1922, pp. 569–575.

ACIDS.—Isocampholic acid. H. Rupe and P. Briellmann. *Helv. Chim. Acta*, October 2, 1922, pp. 767–777.

The influence of the hydrogen ion concentration on the solubility of uric acid. A. Jung. *Helv. Chim. Acta*, October 2, 1922, pp. 688–702.

The alkali salts of benzil and the benzilic acid transformation. H. Staudinger and A. Binkert. *Helv. Chim. Acta*, October 2, 1922, pp. 703–710.

Patent Literature

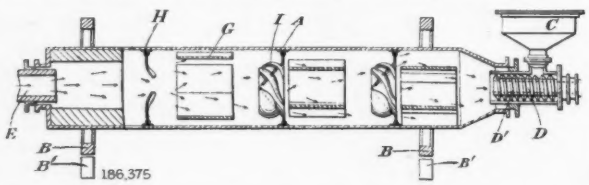
Abstracts of Complete Specifications

186,202. THYMOL, MANUFACTURE AND PRODUCTION OF. J. Y. Johnson, London. From Badische Anilin und Soda Fabrik, Ludwigshafen-on-Rhine, Germany. Application date, July 18, 1921.

This process is for the synthetic manufacture of thymol (methyl-4-isopropyl-3-hydroxy-benzene) on a commercial scale. Meta-cresol is sulphonated, and the meta-cresol-sulphonic acid is treated with isopropyl alcohol and concentrated sulphuric acid at a temperature not above 100° C., or, alternatively, with isopropyl hydrogen sulphate. The mixture is agitated for some time at about the same temperature, and then cooled and distilled with steam at 120°-130° C. The sulphonic group is thereby split off and thymol distilled with the water vapour. Traces of isopropyl ether compound may be separated by caustic soda. The product is fractionally distilled *in vacuo*, and the middle fraction is crystallised and may be further purified by crystallisation from ligroin. The last fraction may be crystallised from benzene, yielding an odourless isomeric thymol which melts at 114°-115° C.

186,375. RETORTS FOR THE TREATMENT OF CARBONACEOUS OR OTHER MATERIALS. F. D. Marshall, 19, Queen Anne's Chambers, Westminster, London. Application date, May 24, 1921.

The retort is for drying, roasting, calcining or distilling carbonaceous or other materials by contact with a current of hot gas. The horizontal retort A is provided with supporting bands B resting on rollers B^1, by means of which the retort is rotated. The material is fed from a hopper C by a screw-conveyer D at one end of the retort, and the hot gas, which may be producer gas or water gas, is admitted through the inlet E at the other end. The conveyer D is made hollow to provide an outlet for the gases evolved in the distillation. Baffle plates G are secured to the retort at one end, and the free end projects into the retort to provide a pocket by which



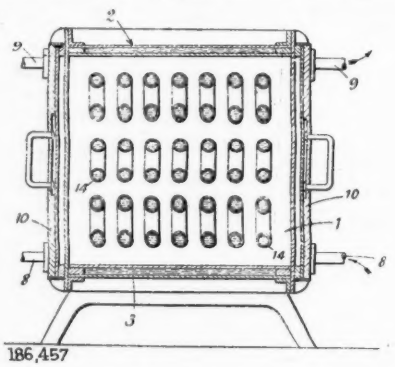
the material is picked up during the rotation of the retort and allowed to fall in a shower through the hot gases. The plates G may alternatively be connected at their inner ends to a central transverse plate, which deflects the hot gases outwards into contact with the material. In another alternative, the inner edges of the baffles G are connected to one another to form completely enclosed pockets. Another baffle H is formed from a plate from which the central portion is cut away, leaving radially projecting arms which are twisted as in a propeller. A whirling motion is thus imparted to the hot gas. Another baffle I is provided, comprising a central conical portion carrying a number of spiral vanes. These baffles tend to cause a deposition of dust from the hot gases.

186,397. POWDERED, COMMINUTED OR FINELY-DIVIDED SUBSTANCES, MEANS FOR FACILITATING THE DELIVERY OR FLOW OF, FROM CONTAINERS AND THROUGH CONDUITS AND THE LIKE. L. Slater, 8, Howard Place, Carlisle. Application date, June 21, 1921.

The object is to prevent binding and settling of finely-divided substances in a hopper or pipe, and thus facilitate their delivery or flow. This is effected by setting up pulsations of the air or gas in the upper part of the container above the powdered substance. The upper part of the container may have a reciprocating piston or ram, or it may be covered by a flexible diaphragm which is caused to vibrate. Alternatively, an air pump may be connected to the top of the container, means being provided to prevent the powdered substance from being drawn into the pump. It is found that the cross-section of the supply pipe should be approximately half that of the container, and the cross-section of the outlet should be less than that of the inlet. A slow, reciprocating movement of the air produces a heavy stream of the powdered substance, and a rapid movement of the air produces a fine cloud. The apparatus may be used for separating fine and coarse material by passing the whole mass over a sieve through which the finer material is discharged. A series of such apparatus may be arranged along a conduit to keep the contents in a state of forward movement.

186,457-8. NICKEL FROM NICKEL CARBONYL, APPARATUS FOR THE MANUFACTURE AND PRODUCTION OF. H. E. Fierz, 2, Boendlerstrasse, Kilchberg, near Zurich, Switzerland, and H. A. Prager, 69, Fleet Street, London, E.C.4. Application date, July 14, 1921.

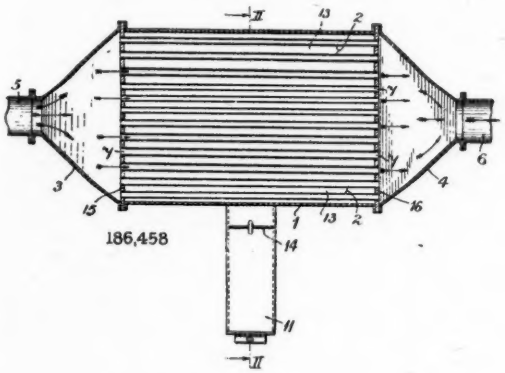
When a current of gas containing nickel carbonyl is passed through a chamber heated externally to about 180° to 250° C., part of the nickel separates as a compact deposit on the heated walls of the chamber and the remainder separates in the form of a sponge or powder which is very finely divided. It is now found that the deposition of finely-divided nickel may be prevented by cooling the gases containing the nickel carbonyl in the heated chamber, except where they are in contact with the heated surface. The temperature at which decomposition



begins varies according to the pressure of the gas and the percentage of nickel carbonyl, and the speed of decomposition is doubled for each 10° rise of temperature. The ratio of the quantity of nickel deposited in compact form to that deposited in powder form increases much more rapidly than the increase in the difference of temperature. The best temperature of the heated surface for the deposition of nickel carbonyl is about 300° C., because at a higher temperature nickel is liable to be contaminated with carbon by absorption from carbon dioxide. The nickel carbonyl in other parts of the apparatus should be cooled to about 100° C. The decomposition chamber 1 is double-walled, and the top 2 and the bottom 3 are cooled by the circulation of water. The sides 10 are heated to about 300° C. by circulating producer gas from the inlets 8 to the outlets 9. Pipe coils 14 are provided to cool the gas in the central part of the chamber. When a sufficient deposit of nickel is obtained on the side walls the flow of gas is stopped and the remaining carbon monoxide and other gases are displaced with nitrogen or steam. The sides 10 may then be detached and removed for the recovery of nickel. The cake of nickel is readily detached if the sides are coated with graphite.

186,458.—This is an alternative method of preventing the deposition of nickel in powder form during the recovery of metallic nickel from nickel carbonyl. In this case the gases are passed between a number of parallel plates which are hollow and through which a heating medium is passed. The distance between the plates depends on the rate of flow of the gas, the gas pressure, the temperature of the plates, and the proportion of nickel carbonyl in the gas. The plates are preferably spaced at about ¾ in. apart, but the distance may be increased with an increase of the rate of flow of the gas. The plates are preferably heated to about 250°-300° C., either by passing hot

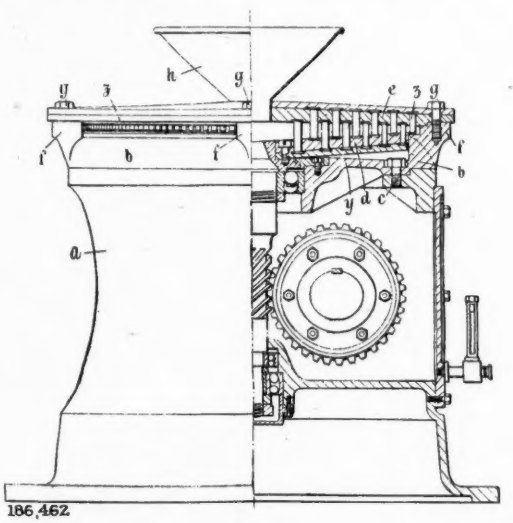
gases through them, or by electrical means. The plates 2 are heated by producer gas, which is admitted through the inlet 11, provided with a regulating damper 14, and which passes upwards between alternate pairs of plates to an outlet at the top. The nickel carbonyl is supplied through the inlet 5 to



the space 3, from which it passes through the remaining alternate spaces between the plates to the chamber 4 and outlet 6. The chambers 3 and 4 are detachable, so that the plates 2 are accessible for the removal of the nickel.

186,462. GRINDING, DISINTEGRATING AND MIXING MACHINES. J. W. Spensley, of the Chemical Engineering Co. (Manchester), Ltd., 49, Deansgate, Manchester. Application dates, July 18, 1921, February 23 and April 13, 1922.

The apparatus is of the kind in which a horizontal rotating disc is parallel and close to a similar fixed disc, and both discs are provided with annular rows of pins. This apparatus is capable of disintegrating wet, sticky or oily materials without choking of the passages. The casing *a* containing the driving gear carries a horizontal plate *y* over the circumference *b* of which the ground material is delivered. The driving shaft is carried on ball bearings in the plate *y*, and carries the rotating disc *d*. A stationary top disc *e* is supported by four lugs *f* from the delivery ring *b*, so that the annular delivery passage is obstructed only by the lugs *f*. The grinding space between the discs *d* and *e* contains concentric rows of pins which



project from each disc alternately, the outermost row *z* being carried by the fixed disc *e*. It is found that the provision of these additional pins *z* ensures that the material is ground to a greater degree of fineness in one passage through the machine, without an appreciable increase in the consumption of power. The outward current of air which is induced through the apparatus is always sufficient to ensure the discharge of the ground material. The material is supplied from a hopper to the inlet *h*, and the upper part of the machine is surrounded by a collecting chamber for the ground material. It is found that many materials may be satisfactorily treated in this machine which could not be treated in machines having a tangential discharge, without choking up the discharge. The machine may be run at a speed up to 20,000 feet per minute at the circumference of the disc, and at such speeds a very intense disintegrating effect is obtained, so that chemical reactions may be effected immediately which usually involve prolonged treatment with heating and agitation.

186,497.—TUNGSTEN, MANUFACTURE OF. The General Electric Co., Ltd., Magnet House, Kingsway House, London, W.C.2, and C. J. Smithells, of the General Electric Co., Ltd., Brook Green, Hammersmith, London, W.6. Application date, August 23, 1921.

The object is to obtain tungsten in a form in which it retains its original strength when used in an incandescent lamp. This has previously been done by adding to the tungsten compound from which the metal is made, substances which leave in the resulting metal traces of oxides which are not reducible by hydrogen, such as lime, thoria, alumina or silica. The resulting tungsten is stronger after long-continued heating than pure tungsten, but possesses no ductility. It is now found that this loss of ductility may be minimised by adding also a small proportion of a compound of an alkali metal. The irreducible oxide should be present in the proportion of about 0·75 per cent. The alkali compound—*e.g.*, sodium chloride—may be added after precipitation of the tungstic acid, in the proportion of 0·03 per cent. to 0·3 per cent., depending on the temperature of the subsequent reduction. If sodium tungstate is used as the original tungsten compound, the acid is precipitated by adding hydrochloric acid and the precipitate is washed until it contains the required proportion of sodium chloride. The addition of the refractory oxide and the alkali compound may be effected together by adding a salt such as sodium silicate or aluminate, precipitating, and then washing. In an example, tungstic oxide is mixed with 0·2 per cent. of sodium chloride, and with 0·65 per cent. of thoria in the form of thorium nitrate. The best results are obtained by reducing the mixture for 4 hours at about 1050° C. It is found that in the subsequent crystallisation of the filaments made from this tungsten, long crystals are formed, so that the filament retains its mechanical strength.

186,515. 1 : 4-NAPHTHOL SULPHONIC ACID, MANUFACTURE OF. British Dyestuffs Corporation, Ltd., Imperial House, Kingsway, London, J. Baddiley, J. B. Payman, and E. G. Bainbridge, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, September 10, 1921.

The commercial manufacture of 1 : 4-naphthol-sulphonic acid from naphthalene is usually effected through the intermediates α-nitronaphthalene, α-naphthylamine, and α-naphthionic acid, in succession. This process has the disadvantage that the α-naphthylamine and the α-naphthionic acid require purification, and the decomposition or oxidation products of the sulphites used in treating the α-naphthionic acid are present in the final, 1 : 4-naphthol-sulphonic acid. In the present process, 1 : 4–naphthol-sulphonic acid is prepared directly from α-naphthol by treating with chlor-sulphonic acid in the presence of a solvent which is not affected by the reagents at the sulphonation temperature, such as benzene or nitrobenzene, or preferably tetra-chlorethane. The temperature should be below 30° C. In an example, a mixture of α-naphthol 144 parts and tetra-chlorethane 600 parts is heated to dissolve the α-naphthol, and then cooled below 10° C., and chlor-sulphonic acid 128 parts added. The mixture is then heated to 50° C. for twenty-four hours, cooled, diluted, and neutralised with sodium carbonate. The solvent is recovered, leaving a sodium salt of 1 : 4-naphthol sulphonic acid, which may be evaporated to dryness and is free from inorganic impurities. The product may contain 1 to 2 per cent. of an isomeric sulphonic acid, which may be removed by precipitating with barium chloride and filtering the solution. In a modification, milk of lime may be used as the neutralising agent.

186,517. NEW BASIC DYESTUFFS POSSESSING AFFINITY FOR UNMORDANTED VEGETABLE FIBRE, MANUFACTURE OF. British Dyestuffs Corporation, Ltd., Imperial House, Kingsway, London; J. Baddiley, E. H. Rodd, and H. L. Stocks, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, September 14, 1921.

These basic dyestuffs of greenish colour are faster than the known basic greens, and are capable of giving a bright shade on unmordanted cotton. The dyestuffs are triaryl-methane derivatives containing a thiazol ring. Tetra-methyl-diamino-benzhydrol (Michler's hydrol) or its homologues or equivalent tetra-alkyl-diamino-benzhydrol, in which one or two of the alkyl groups may be benzyl groups, are condensed with an arylbenzthiazol, and the resulting leuco compounds are oxidised. Suitable benzthiazols are 1-phenyl-5-methyl-benzthiazol and 4[1]-amino-1-phenyl-5-methylbenzthiazol (dehydrothio-toluidine). In an example, 1-phenyl-5-methyl-benzthiazol is prepared by sulphurising monobenzyl-*p*-toluidine, mixed with Michler's hydrol and sulphuric acid monohydrate, and heated until hydrol cannot be detected. The mixture is diluted and neutralised with caustic soda to precipitate the leuco base, which is filtered, washed, and dried. The base is dissolved in hydrochloric acid and oxidised with lead peroxide. Lead is precipitated by adding anhydrous sodium sulphate, and the solution heated to 60° C. and filtered. The dye is precipitated by adding common salt, and may be used for dyeing unmordanted cotton or tannin-mordanted cotton. Other examples are given in which the leuco base is acetylated and then oxidised, and in which the leuco base is obtained from a condensation of Michler's hydrol with 4[1]-methoxy-1-phenyl-5-methyl-benzthiazol.

NOTE.—Abstracts of the following specifications which are now accepted appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention:—166,525 (R. Adler), relating to a method and apparatus for lixiviation, see Vol. V., p. 383; 168,070 (Stockholms Superfosfat Fabriks Aktiebolag), relating to granulation of calcium cyanamide, see Vol. V., p. 499: 172, 923 (N. Goslings), relating to a process for the purification of oils and fats, see Vol. VI., p. 209.

International Specifications not yet Accepted

185,403. THIOHYDRINS. Farbwerke vorm. Meister, Lucius and Brüning, Hoechst-on-Main, Germany. International Convention date, August 27, 1921.

Propylene chlorhydrin is obtained from propylene and hypochlorous acid, and is then treated with alkali sulphides to obtain propylene-thiohydrin. Ethylene chlorhydrin may be added before treatment with alkali sulphides, the product then being propylene ethylene thiohydrin, which may be mixed with ethylene thiohydrin. The products are solvents for organic dyestuffs. The starting material may be an olefinic gas mixture such as oil-gas, Blau gas, or natural gases.

LATEST NOTIFICATIONS.

187,579. Manufacture of Portland cement and the like. Bühler, Geb. October 15, 1921.
187,592. Process for the production of hydrogen sulphide. Howard, H. October 20, 1921.
187,603. Method and apparatus for recovering and concentrating acetic acid from pyroligneous acid. Brewster, T. J.
187,619. Manufacture of resins from aldehydes. Consortuim für Elektrochemische Industrie Ges. October 20, 1921.

Specifications Accepted, with Date of Application

166,888. Ores and the like, Treatment and concentration of. H. H. Smith. July 26, 1920.
169,185. Aliphatic dialkylaminoalkyl compounds, Process of preparing. Farbwerke vorm Meister, Lucius and Brüning. September 17, 1920. Addition to 167,781.
173,230. Colloidally soluble substances and suspensions or emulsions, Manufacture of. L. Lilienfeld. December 21, 1920. Addition to 156,725.
173,236. Rare metals, Process for the preparation of. Westinghouse Lamp Co. December 21st, 1920.
173,502. Magnesia from dolomite, Manufacture of. C. Clare and A. Nihoul. December 24, 1920.
179,934. Fertilisers, Process for the manufacture of. A. d'Ercole. May 14, 1921.
186,945. Gases, oil vapours, or gaseous mixtures, Method and apparatus for the treatment of. J. F. Ward, H. Nielsen and B. Laing. March 31, 1921.
186,950. Viscous oily compositions, and treatment for waxes for use therein, Manufacture of. Plauson's (Parent Co.), Ltd. (*H. Plauson*). April 13, 1921.
186,955. Petroleum and petroleum distillates, Treatment of. A. E. Dunstan, and F. B. Thole. May 9, 1921.
186,956. Grinding or crushing machines. D. J. G. Miller and R. A. Lloyd. May 13, 1921.
186,960. Separating saponaceous matter from lime sludge, Process of. P. Krebitz. June 3, 1921.
187,007. Stills. N. Bologa. July 9, 1921.
187,016. Sulphuric acid, Process for the production of. T. Schmiedel and H. Klencke. July 12, 1921. Addition to 149,648.
187,035. Sulphate of ammonia, Manufacture of. W. C. Holmes and Co., W. G. Adam, and C. Cooper. July 16, 1921.
187,051-2. Alcohol ether mixtures, Manufacture of. H. Wade. (*F. E. Lichtenthaeler.*) July 27, 1921.
187,076. Gasification of coal and other carbonaceous material, Methods and means for. A. S. Foster. August 15, 1921.
187,090. Precipitation purposes, Chemical apparatus for. British Thomson-Houston Co., Ltd. (*General Electric Co.*) August 29, 1921.
187,111. Nickel, Manufacture of pure. H. Sefton-Jones. (*Soc. Anon. "Le Nickel."*) September 16, 1921.
187,129. Aromatic amino-alcohols, Manufacture of optically-active. O. Y. Imray. (*Soc. of Chemical Industry in Basle.*) October 4, 1921.

Applications for Patents

Aische, M. I. Production of organic sulphonated oils of animal origin, etc. 28995. October 25.
Barnes, E. A. Manufacture of fulminate of mercury. 28788. October 23.
Barrett Co. Manufacture of aromatic aldehydes. 28836. October 23. (United States, November 18, 1921.)
Burt, Boulton, and Haywood, Ltd. Manufacture of indophenolic bodies. 29258. October 26.
Chemical Engineering and Wilton's Patent Furnace Co., Ltd., and Shadbolt, S. M. Distillation of tar. 29110. October 25.
Chemische Werke Altstetten Akt.-Ges. and Napp, H. R. Process for manufacture of 1-phenyl-2.3-dimethyl-4 dimethylamino-5-pyrazolone. 29374. October 27.
Du Pont de Nemours and Co., E. I., and Nobel Industries, Ltd. Nitration of cellulose. 29092. October 25.
Durant, H. T., and Sulman H. L. Treatment of ores containing oxide of copper or zinc. 29516. October 28.
Exportingenieure für Papier und Zellstofftechnik Ges. and Hydroloid, Ltd. Treatment of asbestos materials. 29059. October 25.
Jaques, A., and West, J. H. Manufacture of ammonium compounds. 29532. October 28.
Oddy, T. Distillation of coal, peat, wood, etc. 29469. October 28.
Oddy, T. Purifying, etc., hydrocarbons, etc. 29470, 29472. October 28.
Plauson, H., and Plauson's (Parent Co.), Ltd. Dyeing. 28881. October 24.
Plauson, H., and Plauson's (Parent Co.), Ltd. Process for colouring rubber, etc. 29202. October 26.
Plauson, H., and Plauson's (Parent Co.), Ltd. Dyes, etc. 29321. October 27.
Southgate, F. Apparatus for distillation and testing of carbonaceous matter. 28768. October 23.
Sumner, A. W. Manufacture of gas. 29368. October 27.
Techno-Chemical Laboratories, Ltd., and Testrup, N. Rotatable heat-transmitting appliances. 29239. October 26.
Tullis, D. R. Process for recovery of aluminium. 29309. October 27.
Wade-Wilton Synthetic Drug and Chemical Co. Floors for buildings. 28857. October 24.
White, W. C. Low-temperature carbonisation of carbonaceous material, etc. 29241. October 26. (British India, January 18.)

Death of Professor Crum Brown

WE regret to record the death, on October 28, at Belgrave Crescent, Edinburgh, of Professor Alexander Crum Brown, F.R.S., in his 85th year. Born in Edinburgh in 1838, he was educated at the Royal High School there, at Edinburgh University, Hendelberg, and Marburg. In 1863 he was appointed as extra academical Lecturer in Chemistry in Edinburgh University and was appointed to the Professorship in 1869. He was a brilliant theoretical chemist, and, by reason of his own remarkable mental activity, often seemed to be impatient of the slower processes by which chemical facts are actually established. A man of wide accomplishments and of remarkable catholicity in his intellectual interests and pursuits, he retained the Chair of Chemistry at Edinburgh until 1908, when he retired. The interment took place on Tuesday at the Dean Cemetery, Edinburgh.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

LONDON, NOVEMBER 2, 1922.

BUSINESS has been quietly steady without any marked activity during the past week. The demand is fairly well maintained, and values on the whole firm.

Export demand is quiet.

General Chemicals

ACETONE continues very firm with little material offering.
ACID ACETIC is quite active, and the price extremely firm.
ACID CITRIC is featureless, and in buyers' favour.
ACID FORMIC maintains its advance, and is in good demand.
ACID LACTIC is firmer, and in better request.
ACID OXALIC has been moderately active at last quoted figures.
ACID TARTARIC continues easy, and is in poor request.
BARIUM CHLORIDE is in good demand, but the price has eased very slightly.
COPPER SULPHATE is without change in value.
CREAM OF TARTAR is very firm, and there has been a good demand, especially on export account.
FORMALDEHYDE has advanced in value, and is in good request.
IRON SULPHATE is a poor market.
LEAD ACETATE is firmer, and business is very active.
LEAD NITRATE is also a shade firmer, and in better request.
LITHOPONE is quiet and steady.
POTASSIUM BICHROMATE has been reduced by the makers.
POTASSIUM CARBONATE is in good supply and inclined to be easy.
POTASSIUM CAUSTIC is only in small request, with price in buyers' favour.
POTASSIUM PERMANGANATE. The price has been reduced by English makers.
SODIUM ACETATE has been very active, and spot material is scarce.
SODIUM BICHROMATE has also been reduced by the makers.
SODIUM HYPOSULPHITE is without change in value, and in fair request.
SODIUM PRUSSIATE maintains its scarce position and is firm.
SODIUM SULPHIDE continues in good request at the reduced level.
ZINC OXIDE is scarce and firm.

Coal Tar Intermediates

Business in this section continues on quiet lines, with slightly more inquiry about.

ALPHA NAPHTHOL is quiet and steady.
ALPHA NAPHTHYLAMINE has been slightly more interesting, and is firm.
ANILINE OIL has been reduced in price, and a fair business is moving.
BENZIDINE BASE has been in good demand, and price is steady.
BETA NAPHTHOL is quiet, and lttle good material seems available at recent values.
DIANISIDINE continues in short supply.
DIMETHYLANILINE is without change in value, and supplies do not seem excessive.
DIPHENYLAMINE is very firm, and in steady demand.
"G" SALT is without special feature.
"H" ACID is steady, and has been the subject of some inquiry.
METADINITROBENZOL has been inquired for.
METANITRANILINE.—Some home business has been placed.
METAPHENYLENEDIAMINE has been a firm home business, and resale stocks seem pretty clear.
NITRONAPHTHALENE.—Some inquiries have been received.
PARAPHENYLENEDIAMINE is very firm.
RESORCIN.—Some home business is in the market, and supplies at a reasonable figure seem short.

Coal Tar Products

There is no great change to report in the condition of coal tar products from last week.

90's BENZOLE remains fairly steady at about 1s. 9d. per gallon on rails in the North, and 1s. 11d. to 2s. per gallon in London.
PURE BENZOLE is weak, and has a poor inquiry. It is worth about 2s. 1d. per gallon on rails in the North, and 2s. 3d. to 2s. 4d. per gallon in the South.
CREOSOTE OIL is in good demand, and the price is steady at 6d. per gallon on rails in the North, and 7d. at works in London.
CRESYLIC ACID has a poor inquiry, and is somewhat unsettled owing to the American tariff. It is worth about 2s. 2d. per gallon for the pale quality 97/99%, while the dark is worth about 1s. 11d. to 2s. per gallon on rails.
SOLVENT NAPHTHA is easy at 1s. 8d. per gallon on rails in the North, and 1s. 10d. to 1s. 11d. in London.
HEAVY NAPHTHA is in poor demand, and is worth about 1s. 6d. to 1s. 7d. per gallon on rails.
NAPHTHALENE.—The improved inquiry for crude qualities is maintained, and the lower grades are worth about £6 per ton, while whizzed and hot pressed are worth about £7 to £7 10s. per ton.
PITCH.—The market continues very firm, and a further advance in price has taken place. To-day's quotations are 117s. 6d. to 120s. f.o.b. East Coast, and 115s. to 120s. f.o.b. West Coast, with very few sellers of pitch for delivery this year. There are rather sellers than buyers at the above prices for January/April delivery.

Sulphate of Ammonia

There is no change in the position.

Current Prices

Chemicals

	Per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	1	8	to	0	1	10
Acetone oil	ton	80	0	0	to	82	10	0
Acetone, pure	ton	122	0	0	to	125	0	0
Acid, Acetic, glacial, 99–100%	ton	67	0	0	to	68	0	0
Acetic, 80% pure	ton	43	0	0	to	44	0	0
Arsenic, liquid, 2000 s.g.	ton	67	0	0	to	70	0	0
Boric, cryst.	ton	60	0	0	to	65	0	0
Carbolic, cryst. 39–40%	lb.	0	0	7	to	0	0	7½
Citric	lb.	0	1	9	to	0	1	10
Formic, 80%	ton	58	10	0	to	60	0	0
Gallic, pure	lb.	0	3	0	to	0	3	3
Hydrofluoric	lb.	0	0	7½	to	0	0	8½
Lactic, 50 vol.	ton	41	0	0	to	43	0	0
Lactic, 60 vol.	ton	43	0	0	to	44	0	0
Nitric, 80 Tw.	ton	27	0	0	to	29	0	0
Oxalic	lb.	0	0	7¼	to	0	0	7½
Phosphoric, 1.5	ton	40	0	0	to	42	0	0
Pyrogallic, cryst.	lb.	0	5	9	to	0	6	0
Salicylic, Technical	lb.	0	1	0	to	0	1	2
Salicylic, B.P.	lb.	0	1	4	to	0	1	5
Sulphuric, 92–93%	ton	6	10	0	to	7	10	0
Tannic, commercial	lb.	0	2	3	to	0	2	9
Tartaric	lb.	0	1	3	to	0	1	3½
Alum, lump	ton	10	0	0	to	10	10	0
Alum, chrome	ton	27	0	0	to	28	0	0
Alumino ferric	ton	9	0	0	to	9	5	0
Aluminium, sulphate, 14–15%	ton	10	10	0	to	11	0	0
Aluminium, sulphate, 17–18%	ton	11	10	0	to	12	0	0
Ammonia, anhydrous	lb.	0	1	6	to	0	1	8
Ammonia, .880	ton	33	0	0	to	35	0	0
Ammonia, .920	ton	21	0	0	to	23	0	0
Ammonia, carbonate	lb.	0	0	4	to	0	0	4½
Ammonia, chloride	ton	60	0	0	to	65	0	0
Ammonia, muriate (galvanisers)	ton	35	0	0	to	37	10	0
Ammonia, nitrate (pure)	ton	35	0	0	to	40	0	0

	Per	£	s.	d.		£	s.	d.
Ammonia, phosphate	ton	68	0	0	to	70	0	0
Ammonia, sulphocyanide	lb.	0	1	10	to	0	2	0
Amyl acetate	ton	175	0	0	to	185	0	0
Arsenic, white, powdered	ton	49	0	0	to	51	0	0
Barium, carbonate, 92–94%	ton	15	0	0	to	16	0	0
Barium, Chlorate	ton	65	0	0	to	70	0	0
Barium Chloride	ton	19	0	0	to	20	0	0
Nitrate	ton	27	10	0	to	30	0	0
Sulphate, blanc fixe, dry	ton	20	10	0	to	21	0	0
Sulphate, blanc fixe, pulp	ton	10	5	0	to	10	10	0
Sulphocyanide, 95%	lb.	0	1	0	to	0	1	3
Bleaching powder, 35–37%	ton	12	0	0	to	—		
Borax crystals	ton	29	0	0	to	33	0	0
Caffein	lb.	0	13	6	to	0	14	6
Calcium acetate, Brown	ton	10	10	0	to	11	10	0
,, ,, Grey	ton	15	10	0	to	16	0	0
Calcium Carbide	ton	16	0	0	to	17	0	0
Chloride	ton	6	0	0	to	—		
Carbon bisulphide	ton	50	0	0	to	52	0	0
Casein technical	ton	47	0	0	to	55	0	0
Cerium oxalate	lb.	0	4	6	to	0	4	9
Chromium acetate	lb.	0	1	1	to	0	1	3
Cobalt acetate	lb.	0	6	0	to	0	6	6
Oxide, black	lb	0	9	6	to	0	10	0
Copper chloride	lb.	0	1	2	to	0	1	3
Sulphate	ton	26	10	0	to	27	0	0
Cream Tartar, 98–100%	ton	100	0	0	to	102	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde, 40% vol.	ton	75	0	0	to	77	0	0
Formusol (Rongalite)	lb.	0	2	6	to	0	2	9
Glauber salts, commercial	ton	5	0	0	to	5	10	0
Glycerine, crude	ton	65	0	0	to	67	10	0
Hydrogen peroxide, 12 vols.	gal.	0	2	4	to	0	2	5
Iron perchloride	ton	30	0	0	to	32	0	0
Iron sulphate (Copperas)	ton	3	10	0	to	4	0	0
Lead acetate, white	ton	41	0	0	to	42	0	0
Carbonate (White Lead)	ton	42	0	0	to	47	0	0
Nitrate	ton	44	10	0	to	45	0	0
Litharge	ton	35	10	0	to	36	0	0
Lithopone, 30%	ton	23	10	0	to	24	0	0
Magnesium chloride	ton	5	10	0	to	6	0	0
Carbonate, light	cwt.	2	10	0	to	2	15	0
Sulphate (Epsom salts commercial)	ton	7	10	0	to	8	0	0
Sulphate (Druggists')	ton	11	0	0	to	11	10	0
Manganese Borate, commercial	ton	65	0	0	to	75	0	0
Sulphate	ton	60	0	0	to	62	0	0
Methyl acetone	ton	70	0	0	to	75	0	0
Alcohol, 1% acetone	ton	70	10	0	to	75	0	0
Nickel sulphate, single salt	ton	49	0	0	to	51	0	0
Ammonium sulphate, double salt	ton	51	0	0	to	52	0	0
Potash, Caustic	ton	32	0	0	to	33	0	0
Potassium bichromate	lb.	0	0	6	to	—		
Carbonate, 90%	ton	31	0	0	to	33	0	0
Chloride, 80%	ton	12	0	0	to	12	10	0
Chlorate	lb.	0	0	4½	to	0	0	5
Metabisulphite, 50–52%	ton	84	0	0	to	90	0	0
Nitrate, refined	ton	43	0	0	to	45	0	0
Permanganate	lb.	0	0	8½	to	0	0	9
Prussiate, red	lb.	0	4	6	to	0	4	9
Prussiate, yellow	lb.	0	1	7	to	0	1	8
Sulphate, 90%	ton	13	0	0	to	13	10	0
Salammoniac, firsts	cwt.	3	3	0	to	—		
Seconds	cwt.	3	0	0	to	—		
Sodium acetate	ton	24	10	0	to	24	15	0
Arseniate, 45%	ton	45	0	0	to	48	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	4¾	to	—		
Bisulphite 60–62%	ton	21	0	0	to	23	0	0
Chlorate	lb.	0	0	3½	to	0	0	4
Caustic, 70%	ton	20	10	0	to	21	0	0
Caustic, 76%	ton	21	10	0	to	22	10	0
Hydrosulphite, powder, 85%	lb.	0	1	9	to	0	2	0
Hyposulphite, commercial	ton	12	0	0	to	12	10	0
Nitrite, 96–98%	ton	29	10	0	to	30	0	0
Phosphate, crystal	ton	16	10	0	to	17	0	0
Perborate	lb.	0	0	11	to	0	1	0
Prussiate	lb.	0	0	11½	to	0	1	0
Sulphide, crystals	ton	12	0	0	to	12	10	0
Sulphide, solid, 60–62%	ton	20	10	0	to	22	10	0
Sulphite, cryst.	ton	12	10	0	to	13	0	0
Strontium carbonate	ton	55	0	0	to	60	0	0
Strontium Nitrate	ton	43	0	0	to	45	0	0
Strontium Sulphate, white	ton	6	10	0	to	7	10	0
Sulphur chloride	ton	25	0	0	to	27	10	0
Sulphur, Flowers	ton	11	0	0	to	12	0	0
Roll	ton	11	0	0	to	12	0	0

	Per	£	s.	d.		£	s.	d.
Tartar emetic	lb.	0	1	4	to	0	1	5
Theobromine	lb.	0	12	6	to	0	13	0
Tin perchloride, 33%	lb.	0	1	2	to	0	1	4
Perchloride, solid	lb.	0	1	5	to	0	1	7
Protochloride (tin crystals)	lb.	0	1	5	to	0	1	6
Zinc chloride 102° Tw.	ton	21	0	0	to	22	10	0
Chloride, solid, 96–98%	ton	25	0	0	to	30	0	0
Oxide, 99%	ton	37	0	0	to	38	0	0
Dust, 90%	ton	45	0	0	to	47	10	0
Sulphate	ton	16	10	0	to	17	10	0

Coal Tar Intermediates, &c.

Alphanaphthol, crude	lb.	0	2	3	to	0	2	6
Alphanaphthol, refined	lb.	0	3	0	to	0	3	3
Alphanaphthylamine	lb.	0	2	0	to	0	2	1
Aniline oil, drums extra	lb.	0	0	10	to	0	0	11
Aniline salts	lb.	0	0	11	to	0	1	0
Anthracene, 40–50%	unit	0	0	8½	to	0	0	9
Benzaldehyde (free of chlorine)	lb.	0	3	6	to	0	4	0
Benzidine, base	lb.	0	5	0	to	0	5	3
Benzidine, sulphate	lb.	0	5	0	to	0	5	3
Benzoic acid	lb.	0	2	0	to	0	2	2
Benzoate of soda	lb.	0	1	10	to	0	2	0
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	0	5	0	to	0	5	3
Betanaphthol	lb.	0	1	4	to	0	1	4½
Betanaphthylamine, technical	lb.	0	5	0	to	0	5	6
Croceine Acid, 100% basis	lb.	0	3	6	to	0	3	9
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	2	9	to	0	3	0
Dinitrobenzol	b.	0	1	3	to	0	1	4
Dinitrochlorbenzol	lb.	0	0	11	to	0	1	0
Dinitronaphthalene	lb.	0	1	4	to	0	1	5
Dinitrotoluol	lb.	0	1	5	to	0	1	6
Dinitrophenol	lb.	0	1	9	to	0	2	0
Dimethylaniline	lb.	0	2	6	to	0	2	9
Diphenylamine	lb.	0	4	3	to	0	4	6
H-Acid	lb.	0	6	0	to	0	6	3
Metaphenylenediamine	lb.	0	4	9	to	0	5	3
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	6	0	to	0	6	6½
Metatoluylenediamine	lb.	0	4	6	to	0	4	9
Monosulphonic Acid (2.7)	lb.	0	5	6	to	0	6	0
Naphthionic acid, crude	lb.	0	2	9	to	0	3	0
Naphthionate of Soda	lb.	0	3	0	to	0	3	3
Naphthylamin-di-sulphonic-acid	lb.	0	4	0	to	0	4	3
Neville Winther Acid	lb.	0	7	9	to	0	8	0
Nitrobenzol	lb.	0	0	9	to	0	0	9½
Nitronaphthalene	lb.	0	1	2	to	0	1	3
Nitrotoluol	lb.	0	1	0	to	0	1	2
Orthoamidophenol, base	lb.	0	12	0	to	0	12	6
Orthodichlorbenzol	lb.	0	1	0	to	0	1	1
Orthotoluidine	lb.	0	1	6	to	0	1	9
Orthonitrotoluol	lb.	0	0	8	to	0	0	10
Para-amidophenol, base	lb.	0	9	0	to	0	9	6
Para-amidophenol, hydrochlor	lb.	0	8	6	to	0	9	0
Paradichlorbenzol	lb.	0	0	6	to	0	0	7
Paranitraniline	lb.	0	3	6	to	0	3	9
Paranitrophenol	lb.	0	2	3	to	0	2	6
Paranitrotoluol	lb.	0	5	0	to	0	5	3
Paraphenylenediamine, distilled	lb.	0	10	6	to	0	10	9
Paratoluidine	lb.	0	6	0	to	0	6	6
Phthalic anhydride	lb.	0	2	9	to	0	3	0
Resorcin, technical	lb.	0	4	6	to	0	5	0
Resorcin, pure	lb.	0	6	3	to	0	6	6
Salol	lb.	0	2	0	to	0	2	3
Sulphanilic acid, crude	lb.	0	1	0	to	0	1	1
Tolidine, base	lb.	0	6	6	to	0	7	0
Tolidine, mixture	lb.	0	2	6	to	0	2	9

Claim for Fat Extraction Process

BEFORE the Royal Commission on Awards to Inventors on Wednesday, Major G. W. Ellis, who was known as the "Fat King" in the Army during the war, claimed an award in respect of the "Ellisfield" fat-extracting plant. He claimed that with this plant waste products of camps and bases were treated in such a way that all the fat they contained was separated and reduced to a condition in which it could be sent to England for the manufacture of glycerin. Bones were also so treated that they might be sent home for the extraction of glue. It was also claimed that for every ton of fat salved by Major Ellis' plant there was glycerin for a potential ton of propellant explosive.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

GLASGOW, NOVEMBER 1, 1922.

THERE is little of importance to record this week. The amount of business put through continues moderate and there is no important change in price with the exception of acetone, which is now quoted as high as £125, although some small spot parcels are on offer at slightly less.

Industrial Chemicals

ACID ACETIC.—Glacial 98/100 %, about £60 to £64 per ton ex wharf; 80% technical, £40 to £42 per ton; 80% pure, £44 to £45 per ton.

ACID BORACIC.—Crystals or granulated, £60 per ton; powdered £62 per ton, ex station.

ACID CITRIC.—Offered at 1s. 9d. per lb ex wharf.

ACID FORMIC, 85%.—Price about £57 to £58 per ton.

ACID HYDROCHLORIC.—Makers' prices unchanged 6s. 6d. per carboy, ex wharf.

ACID NITRIC.—90° Tw. about £25 10s. per ton; 84° Tw., £27 10s. per ton, ex station.

ACID OXALIC.—Price about 7½d. per lb.

ACID SULPHURIC.—144°, £4 per ton; 168°, £7 5s. per ton, ex works. De-arsenicated, £1 per ton more.

ALUM CHROME.—In little demand. Offered at £27 per ton.

ALUM POTASH (LUMP).—Spot lots about £13 10s. to £14 per ton, ex store.

AMMONIA CARBONATE.—Lump 4d. per lb; ground, 4¼d. per lb.; delivered.

AMMONIA LIQUID.—880° about 3½d. per lb.; 940°, 1¾d. per lb.; ex works.

AMMONIA MURIATE.—Grey galvanisers, £32 per ton, ex works. Continental at about £26 per ton, c.i.f. U.K.

AMMONIA SULPHATE.—25¼%, £14 15s. per ton; 25¾%, neutral quality, £15 18s. per ton, ex works, October delivery.

ARSENIC, WHITE POWDERED.—In good demand. Now £52 to £53 per ton, ex quay with supplies scarce.

BARIUM CHLORIDE.—English make £20 per ton, ex works. Continental slightly cheaper.

BARYTES.—Finest white, £5 5s. per ton, ex works.

BLEACHING POWDER.—Price unchanged, £12 15s. per ton, ex station, spot delivery.

BORAX.—Crystal or granulated, £29 per ton; powdered, £30 per ton. Moderate inquiry for export.

CALCIUM CHLORIDE.—English material £6 per ton, ex quay, Continental, £4 per ton, c.i.f.

COPPERAS GREEN.—About £3 15s. per ton, ex works.

DEXTRINE.—Finest potato, at £20 per ton, c.i.f.

FORMALDEHYDE, 40%.—Price advanced to about £74 per ton ex wharf.

GLAUBER SALTS.—Fine white crystals, £4 10s. per ton, ex Store; coarser quality, £4 per ton.

LEAD.—Red, £37 15s. per ton; white advanced to £50 15s. per ton delivered. Continental red lead offered at £34 per ton, spot delivery.

MAGNESITE, GROUND CALCINED.—£7 to £10 per ton, ex store.

MAGNESIUM, CHLORIDE.—Spot lots at £5 10s. per ton. Offered from Continent at £4 per ton c.i.f.

MAGNESIUM SULPHATE (EPSOM SALTS).—Commercial £7 5s. per ton; B.P., £9 per ton.

POTASSIUM BICHROMATE.—Price unchanged at 6¼d. per lb.

POTASSIUM CARBONATE, 90/92%.—Spot lots at £28 per ton, ex store.

POTASSIUM CAUSTIC, 88/92%.—Inclined to be dearer at £29 10s. per ton, ex quay.

POTASSIUM CHLORATE.—Moderate demand, 4¼d. to 4½d. per lb.

POTASSIUM NITRATE (SALTPETRE).—In little request. About £32 per ton, ex store.

POTASSIUM PRUSSIATE YELLOW.—Inclined to be scarce for spot delivery. About 1s. 6¼d. per lb.

POTASSIUM SULPHATE.—90% basis, offered at £13 10s. per ton, ex wharf.

SODIUM ACETATE.—Quoted £23 10s. per ton.

SODIUM BICARBONATE.—Refined quality £10 10s. per ton, ex quay or station; m.w. quality £1 per ton less.

SODIUM BICHROMATE.—Unchanged at 5d. per lb. delivered.

SODIUM CARBONATE.—Soda crystals, £5 10s. to £5 15s. per ton, ex quay or station. Alkali, 58%, £9 2s. 6d. per ton, ex quay or station.

SODIUM, CAUSTIC.—76/77%, £23 5s. per ton; 70/72%, £21 5s. per ton; 60/62%, £20 5s. per ton; 98/99%, powdered, £26 15s. to £27 15s. per ton, ex station; bottoms, £11 per ton, ex store.

SODIUM CHLORATE.—Spot lots offered at 3¼d. per lb., ex station.

SODIUM HYPOSULPHITE.—Commercial, £11 15s. to £12 per ton; pea crystals about £17 10s., ex store.

SODIUM NITRATE.—Price for 96/98% refined quality, £12 5s. per ton, free on rails.

SODIUM PRUSSIATE (YELLOW).—Spot lots scarce, but to be had at 11¼d. per lb., ex station.

SODIUM SILICATE, 140°.—English material, £12 5s. per ton, ex station.

SODIUM SULPHATE (SALTCAKE 95%).—Price for home consumption, £4 per ton, on contract.

SODIUM SULPHIDE.—60/62% conc., offered from Continent at £14 per ton, c.i.f. U.K.; 30/32% crystals, about £8 per ton c.i.f.

SULPHUR.—Government surplus stock of thirds still available at £3 10s. to £3 15s. per ton, ex depot; flowers, £12 per ton; roll, £11 per ton; rock, £10 per ton; ground, £10 per ton. Prices nominal.

TIN CHLORIDE.—Unchanged at 1s. 2d. per lb.

ZINC SULPHATE.—English material, £15 10s. per ton, ex station.

ZINC OXIDE, 99%.—Quoted £38 to £39 per ton.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

BETANAPHTHOL.—Home inquiries. Price about 1s. 2d. per lb., delivered.

BRONNERS ACID.—Export inquiry. Price quoted, 7s. 4d. per lb. 100% basis, f.o.b.

CLEVES ACID.—Export inquiry. Price quoted 4s. per lb. on 100% basis, f.o.b.

DIPHENLYLAMINE.—Home inquiry. Price 4s. 2d. per lb., delivered.

DIMETHYLANILINE.—Home inquiries. Price 2s. 6d. per lb., delivered, in returnable drums.

DIMETHYL DIPHENYL UREA.—Export inquiry. Price quoted 4s. 4½d per lb. f.o.b. U.K. port.

METAPHENYLENEDIAMINE.—Export inquiry. Price quoted 5s. 6d. per lb., f.o.b.

METAXYLYDINE.—Export inquiry. Price 7s. 7d. per lb., f.o.b., drums included.

PARAPHENYLENEDIAMINE BASE.—Home inquiry; price quoted, 12s. 9d. per lb., on 100% basis.

German Potash Industry

THE *Kölnische Zeitung* states that, according to the preliminary statistics of the Potash Examining Office, Berlin, the output of the German potash mines amounted during the first six months of 1922 to 5,893,711 tons of potassium salts (682,787 tons of pure potash K_2O). The sale of potash products was fairly brisk, and amounted from January to June to 1,996,970 tons—*i.e.*, 526,713 tons of pure potash. Compared with the same period last year the inland sales increased, therefore, by 193,386 tons of pure potash, or 58 per cent. This increase is chiefly owing to certain relief measures (such as freight reduction, the granting of discount, etc.). Agriculture covered its requirements more fully than is usual for the autumn, so that the development of the sales for the later part of the year should be judged somewhat carefully, more particularly as the shortage of trucks, which sets in as a rule in the autumn, must be taken into consideration. The amount sold to inland agriculture during the first six months of the year amount to 490,000 tons of pure potash, which represents 93 per cent. of the total inland sales. The sales to industry were comparatively unimportant (35,900 tons pure potash). Export deliveries did not justify expectations.

The Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, November 2, 1922.

The chemical market here has not wholly escaped from the effects of the forthcoming elections. Although the general tone is still healthy there is slightly less activity to be noticed, and on inquiry some of the leading Manchester traders ascribe this entirely to political influences. Home trade consumers, nevertheless, are calling for comparatively good quantities of chemicals.

Foreign inquiries are still rather numerous, but up to the present these are regarded more in the nature of feelers rather than as indications of increased export business. At all events, there has been little if any expansion in actual foreign shipments. Continental demand is very quiet, though on Colonial account trade has shown no falling off from the level of the last few weeks. Prices generally remain firm, with here and there a slight shading off.

Heavy Chemicals

Home consumers of caustic soda are taking good supplies, while a fair amount is being shipped to Colonial markets; prices for home delivery are firm at from £20 5s. per ton for 60 per cent. strength to £23 5s. for 76 per cent. Bleaching powder is in active demand both for home and export, and the price is unchanged at £12 to £12 10s. per ton, in softwood casks. Saltcake is firm at £4 per ton, with a fairly good inquiry. Sodium sulphide is quiet and easier at £17 10s. for 60–65 per cent. concentrated and £12 per ton for crystals. Soda crystals are only in moderate demand at £5 12s. 6d. per ton delivered. Bicarbonate of soda is on offer at £10 10s. per ton, in 2-cwt. bags. Ammonia alkali is rather a quiet section of the market, though the price of 58 per cent. material is firmly maintained t £7 17s. 6d. per ton, in bags, for home delivery. Hyposulphite f soda is steady at £18 for photographic crystals and £10 10s. er ton for commercial. Glauber salts are quiet and unchanged t £4 10s. per ton. Nitrite of soda is a shade easier at £28 per ton, though there has been little falling off in demand, which is still fairly active. The demand for prussiate of soda keeps steady at 11d. to 11¼d. per lb., supplies still being rather short. Phosphate of soda is quiet at about £5 10s. per ton. Chlorate of soda is easier at 2¾d. to 3d. per lb. Acetate of soda is also lower at about £23 per ton, very little business being done.

The contract price for bichromate of soda, for delivery this year, had been reduced to 4¾d. per lb., carriage paid. For 1923 delivery, contracts are being arranged on the basis of 5d. with the insertion of a "falling clause."

Caustic potash is in good demand and firmer at £29 10s. per ton for 88–90 per cent. strength. Carbonate of potash is sluggish but the price is maintained at £29 per ton for 96–98 per cent. material. Bichromate of potash is in steady demand at new contract price of 6d. per lb. Yellow prussiate of potash keeps firm at 1s. 6d. per lb.; red is quoted at 4s. to 4s. 3d. Chlorate of potash is easier at 3¾d. to 4d. Permanganate of potash is in better demand at 7½d. to 7¾d. per lb.

Sulphate of copper is not being called for in quantities by home consumers, while export demand is very quiet; £26 to £27 per ton is quoted. With spot supplies of arsenic still exceedingly scarce and demand good, Cornish white, powdered, on the Manchester market has advanced to about £51 per ton. Commercial Epsom salts are quiet and unchanged at £6 5s. per ton. Acetate of lime is firm at £15 10s. for grey, with spot supplies rather scarce, and £8 5s. per ton for brown. White sugar of lead is now quoted at £37 10s. per ton and brown £34; buyers, however, are not taking particularly big supplies. Nitrate of lead is firm at £43 per ton. Ammonium muriate is steady and in fairly active demand at £35 for grey and £40 per ton for white. Lump alum is quiet but steady at £13 per ton. Formaldehyde keeps firm at about £70 per ton, but supplies are not excessive.

Acids and Tar Products

Tartaric and citric acids are steady but only moderate business is passing; tartaric is still quoted at 1s. 3d., with citric easier at 1s. 11d. per lb. for B.P. quality. The demand for acetic acid keeps up, and glacial is quoted at £65 and 80 per cent technical at £40 per ton. Oxalic acid is quiet but steady at 7d. per lb. Crystallised boracic acid is unchanged at £60 per ton.

The strong foreign demand for pitch keeps the f.o.b. price moving upwards, and £5 5s. per ton is now asked here. Carbolic acid crystals are rather quiet at 6½d. per lb. Crude carbolic is still scarce at 2s. to 2s. 3d. per gallon for 60 per cent. material. Solvent naphtha is firm and in fair demand at 1s. 10d. per gallon for 90–160. Creosote oil is maintained at last week's range of 6¼d. to 6½d. per gallon. Naphthalenes are firm and in quietly steady demand at up to £7 per ton for crude, according to quality, £17 for flake, and £15 per ton for crystals.

A Remarkable Compensation Claim

Damages Against British Dyestuffs Corporation

An unusual claim under the Workmen's Compensation Act came before Judge Mellor in the Manchester County Court on Wednesday, when William Alfred Robinson sued the British Dyestuffs Corporation, Ltd., of Blackley, Manchester, for damages in respect of injuries sustained in 1915, whilst employed by them as a labourer. On behalf of Robinson counsel explained that in June of that year plaintiff was carrying two buckets of acid when he slipped on a greasy floor and was so badly burned about the face, neck and body that he was confined to bed in hospital for about nine months. He was very seriously disfigured but was able to work on his recovery, being employed by the British Dyestuffs Corporation until, owing to the industrial situation, he was discharged along with a number of other men. Counsel stated that as a result of his terrible disfigurement he was unable to secure employment. It was contended that the case was akin to that of the Hunt case, in which the House of Lords decided that as the man's incapacity to obtain work was due to disfigurement owing to the accident he was entitled to compensation under the Workmen's Compensation Act.

For the British Dyestuffs Corporation, Mr. Gilbert Jordan said he had never yet come across a case which dealt with the æsthetic aspect of injuries under the Workmen's Compensation Act and sought to set up a claim that a man was entitled to receive compensation because, while he had recovered from an accident and was able to do his work, he was disfigured in such a way as to be "unpleasant to look upon." There was, in this instance, no parallel with the Hunt case. Mr. Jordan submitted that when a man had recovered and was admittedly able to do his work, the fact that he was less comely could not be taken into account.

His Honour gave a verdict for the plaintiff with costs. There would, he said, be an award of total incapacity, which meant that Robinson was entitled to £1 1s. per week from May 15 of last year. Judge Mellor remarked that the case was unique, and he did not suppose that a question such as was involved in this action had previously been brought under the Workmen's Compensation Act. Here, as in the Hunt case, the accident had as completely affected the plaintiff's prospects of securing employment as if he had been physically incapacitated.

Thefts of Drugs and Chemicals

At the Central Criminal Court, on October 26, the hearing was concluded of the case against Charles Harrison, Sidney Robert Mansfield, and Harry Bogdanor, who were charged with stealing and receiving a quantity of drugs from a warehouse at High Street South, East Ham, the property of Burgoyne, Burbidges and Co., Ltd. Harrison pleaded guilty to stealing the drugs, while the jury, after a trial lasting three days, found Mansfield guilty of conspiracy and stealing and receiving, while Bogdanor was found guilty of receiving. Two other defendants, Wilfred Pomerantz and Solomon Bogdanor were also charged, but the jury stopped the case against them, returning a verdict of not guilty, and they were discharged.

It was stated that Harrison had been employed by Burgoyne, Burbidges and Co., Ltd., for about twenty-two years. Harrison admitted that he had been stealing drugs and chemicals from his employers for about nine months. They were disposed of through Mansfield. The Common Serjeant said that Harrison would have to go to prison for nine months in the second division, while Mansfield would be sentenced to six months in the second division. Bogdanor was bound over in £10 to come up for judgment if called upon.

Company News

BORAX CONSOLIDATED, LTD.—A dividend at the rate of 5 per cent. per annum is announced on the deferred ordinary stock, payable on November 18.

ENGLISH MARGARINE WORKS (1919), LTD.—A notice issued by the directors announces their decision to postpone payment of the preference interim dividend.

AGUAS BLANCAS NITRATE COMPANY.—An interim dividend of 25 per cent., less tax is payable on November 23 to holders of both preference and ordinary shares on the books on November 9.

ALFRED BIRD AND SONS, LTD.—The directors announce a dividend of 10 per cent. and bonus of 6½ per cent. (together 16s. 6d. per share), free of tax, on the ordinary shares, making 21½ per cent. for the year. £57,696 is carried forward.

PEASE AND PARTNERS, LTD.—This company, which owns, *inter alia*, limestone quarries, by-product coke ovens, and iron-stone mines, is offering for sale £1,000,000 5 per cent. debenture stock at 93 per cent.

SANTIAGO NITRATE COMPANY.—The accounts for the year ended June 30 last show a gross profit of £17,220. After deducting London charges and a provision for income tax there remains a net sum of £12,333, which has been added to profit and loss account. It is proposed to pay a dividend of 7½ per cent., less tax, and to carry forward the balance of £9,504. The quota allotted by the Association for the current nitrate year having been sold the oficina still remains closed. The annual meeting will be held at 10, Lime Street, London, E.C., on November 7 at 2.30 p.m.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OR FIRM OR AGENT.	MATERIAL.	REF. NO.
Norway.....	Chemicals	—
India	Drum-making machinery for paints and chemicals.	D.O.T.8720/ E.D./E.P.
India	Heavy chemicals.	—
Roumania....	Insecticides.	—

Contracts Open

Tenders are invited for the following articles. The latest dates for receiving tenders are, when available, given in parentheses :

EGYPT (January 6, 1923).—130,000 kilos of wood naphtha (wood spirit), 5,000 kilos of tieröl (for denaturing ethyl alcohol). Tenders to Director-General of Customs, Office of the Chief Inspector of the Customs Administration, Alexandria, Egypt. Particulars from Department of Overseas Trade (Room 53), 35, Old Queen Street, London, S.W.1. (Reference No. 9321/FE/CP).

Manchester Evening Students' Chemical Society

THE annual general meeting of the Manchester College of Technology Evening Students' Chemical Society was held on October 24, when the following officers were elected for the present session :—President, Professor F. L. Pyman, F.R.S. ; vice-presidents, the Principal, Professor Knecht, Mr. J. Huebner, Capt. Sinnatt, Mr. Radcliffe, Mr. Roberts and Mr. Allan ; joint hon. secretaries, Messrs. S. Rowbottom and J. Haslam ; committee, Messrs. Nuttall, Challis, Weir, Young, Frankland, Taylor and Clough.

Following up proposals made last session, the committee recommended the Society to adopt a form of life membership. The question of the publication of papers read before the Society was also discussed.

A Chemical Manufacturer's Losses

AT the Manchester County Court, on Monday, immediate and unconditional discharge from bankruptcy was granted by Judge Mellor to Alfred Prescott, who had carried on business as Prescott and Co., chemical and aniline dye manufacturers, at Rutland Mills, Oswald Street, Hulme, Manchester, Drake Street, Manchester, and the Mill Bank Chemical Works, Triangle, Halifax. The judge described the case as one of those clearly arising from sheer misfortune. Mr. F. Murgatroyd, the Deputy Official Receiver, stated that debtor's liabilities were estimated at £39,292 13s. 6d., and the assets, so far as they were not assigned to creditors wholly or partly secured, were estimated to produce £7,283 15s. 9d. It was expected that a dividend of about 4s. in the £ would be paid on proofs for £35,945 5s. 7d. That depended largely on the amount realised by the debtor's bankers from the security held by them, the value of this being estimated at £10,000.

The debtor at the end of 1914 had a capital of £5,269, and by the end of 1918 this had increased to £19,348, the debtor having a credit balance at the bank of £12 927. In the four years 1915 to 1918 the debtor had made an inclusive net profit of £47,129. With excess profits duty and withdrawals this was reduced to £14,079. The turnover in those four years was as follows : 1915, £117,067 ; 1916, £176,600 ; 1917, £192,064 ; and 1918, £281,262. The high water mark of the debtor's successful trading was the year 1918, but it was the last year in which he made any profit. In 1921 the turnover fell to £61,350, or £150,000 less than in the previous year. There was a trading loss in 1921 of £18,493. From 1915 to 1918 the trading profits were £47,129, while for the years 1919 to 1921 the trade losses amounted to £45,248. After June, 1920, debtor's business was struck by the general trade depression which set in. It was well known, said Mr. Murgatroyd, that there was nothing more disastrous than a realisation by auction of the buildings and plant of a chemical manufacturer, which were often useless to others. The disaster was, in consequence, made very much worse. On behalf of the debtor it was stated that it was a case of misfortune arising from trade conditions which even the most careful could not possibly have foreseen.

Application of the Quantum Theory

AT a meeting of the Chemical Society of the University of Birmingham, held on Monday, Mr. A. R. Bowen, B.Sc., A.I.C., read a paper entitled "The Quantum Theory and its Application to Chemistry." The lecturer first reviewed the lines of evidence which caused the establishment in physics of the Quantum Theory, commencing with its origin, Planck's explanation of the distribution of radiant energy among the different wave-lengths in the spectrum of a black body. Other physical interpretations of the theory included the Rutherford Bohr atom and Einstein's expression for the atomic heat of monatomic solids. As examples of the application of the Quantum Theory to chemical phenomena the work of Warburg on photochemical reactions and Perrin's theory of fluorescence of organic substances were discussed. Warburg's work on gaseous monomolecular photochemical reactions was shown to bear out Einstein's equivalence law ; that in any photochemical reaction occurring under the action of light of frequency V, one quantum hV of energy is absorbed for every molecule reacting. The lecturer concluded with a description of W. C. McC. Lewis's attempts to explain thermal reactions on a quantum basis, comparing his expression for the temperature-coefficient of reaction velocity with those of Arrhenius, Marcelin and Rice.

New Director of Cast Iron Research

DR. PERCY LONGMUIR, whose appointment as Director of Research to the British Cast Iron Research Association was announced in THE CHEMICAL AGE last week, has been connected with the cast iron industry since 1897. In 1902 he was awarded the Carnegie Research Scholarship by the Iron and Steel Institute, and this was renewed the following year, after which he received the Carnegie Special Medal for his researches. In collaboration with Sir Robert Hadfield and Professor Carpenter, he carried out further research work at the National Physical Laboratory. He was one of the first external examiners in metallurgy appointed for the Sheffield University, and was one of the founders of the Institution of British Foundrymen, of which body he was president in 1910 and 1911.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

BEACHER, Mr. R. E. O., Ripon, chemist. (C.C., 4/11/22.) £22 10s. 1d. September 21.

EDWARDS, Mr. J. M., 311, Fulham Palace Road, S.W., chemist. (C.C., 4/11/22.) £15 15s. 7d. September 19.

HAUSAMANN, Mr. M., 40 or 45, Cranmer Street, The Chase, Nottingham, chemist. £30 7s. 1d. September 27.

HUGHES, Mr. J. H., Red House, Llandilo, chemist. (C.C., 4/11/22.) £13 2s. 10d. September 18.

LENGS, LTD., R/O. 205, High Street, Acton, chemists. (C.C., 4/11/22.) £15 6s. September 19.

LLEWELLYN, Mr., 135, Dunraven Street, Tonypandy, chemist. (C.C., 4/11/22.) £16 1s. 4d. September 27.

NEWMAN, Mr. A. P., 51, Thompson Street, Barry, chemist. (C.C., 4/11/22.) £10 17s. 3d. September 6.

WING, Mr. H. P., 95, Claremont Road, Blackpool, chemist. (C.C., 4/11/22.) £18 12s. 8d. September 29.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

JUDGE BRAND CO., LTD., Gateshead, manufacturing chemists. (M., 4/11/22.) Registered October 20, £5,000 debentures; general charge. *Nil. April 6, 1921.

LEIGHTON LABORATORIES, LTD., London, E.C., manufacturing chemists. (M., 4/11/22.) Registered October 18, £500 debentures, part of £5,000; general charge.

Satisfactions

BASS AND WILFORD, LTD., Nottingham, chemists. (M.S., 4/11/22.) Satisfaction registered October 21, £200, registered January 22, 1915.

HARKER (C. R.), STAGG AND MORGAN, LTD., London, E., manufacturing chemists. (M.S., 4/11/22.) Satisfaction registered October 20, £200, part of amount registered October 21, 1902, and January 1 and April 8, 1903.

London Gazette

Notices of Intended Dividends

CHAMBERS, John, 78, Belle Vue Road, Leeds, formerly 22, Montpellier Walk, Cheltenham, chemist's assistant, formerly chemist. Last day for receiving proofs, November 11. Trustee, F. W. Darley, Official Receiver, 26, Baldwin Street, Bristol.

PRESCOTT, Alfred, carrying on business as PRESCOTT AND CO., at Rutland Mills, Oswald Street, Hulme, Manchester, Drake Street, Manchester, Holt Town, Manchester, and Mill Bank Chemical Works, Triangle, Halifax, in the county of York, chemical and aniline dye manufacturer. Last day for receiving proofs, November 11. Trustee, A. R. Webb, 90, Deansgate, Manchester.

Notice of Dividend

CHEETHAM, Reginald Spencer, 48, Bridge Street, Peterborough, Northants, druggist. Amount per £, 4s. First and final. Payable, November 14, 28, Kimberley House, Holborn Viaduct, London.

Edinburgh Gazette

VIOLIV MANUFACTURING CO., LTD. (C.W.U.V., 4/11/22.) W. M. Drummond, C.A. (James Pollard and Bird, C.A.), 17, Duke Street, Edinburgh, appointed liquidator. Meeting of creditors, 17, Duke Street, Edinburgh, on Tuesday, November 14, at 11.30 a.m.

New Companies Registered

LESLIE ALLAN AND CO. (SOUTH WALES), LTD. Manufacturers and distillers of and dealers in tar and petroleum products; oil blenders, etc. Nominal capital, £10,000 in £1 shares.

BARCO, LTD., 37, Whetstone Park, Kingsway, W.C. Manufacturers of and dealers in disinfectants, sheep dips, insecticides, paints, varnishes, etc. Nominal capital, £500 in £1 shares.

THE COMODORO OIL AND TRANSPORT CO. Manufacturers or producers of oil, gas and liquid fuel, chemical manufacturers, etc. Nominal capital, £115,000 in 110,000 shares of £1 each and 100,000 of 1s. each. A subscriber: L. M. Oaks, 72, Oakfield road, Stroud Green.

THE FOOT-AND-MOUTH DISEASES CURE, LTD., 54A, Parliament Street, Westminster. Manufacturers and suppliers of a preparation for the cure of foot-and-mouth disease among cattle, chemists, druggists, etc. Nominal capital, £18,000 in £1 shares.

MANN, TAYLOR AND CO., LTD., London House, 35, Crutched Friars, E.C.3. Distillers, dye and gas makers, metallurgists, manufacturers of chemicals, etc. Nominal capital, £150,000 in £1 shares.

MEDICAL REMEDIES COMPANY, LTD., 76, Castle Street, Luton, Beds. Wholesale and retail pharmaceutical and analytical chemists and druggists, drysalters, etc. Nominal capital, £500 in £1 shares.

T. J. AND T. POWELL, LTD. Manufacturing and analytical chemists and druggists, oil and colourmen, etc. Nominal capital £30,000 in £1 shares. A subscriber: E. Newton, 81, Gresham Street, E.C.2.

J. L. PRIESTLEY AND CO., LTD. Druggists, drysalters, etc. Nominal capital, £1,000 in £1 shares. Secretary: N. R. Dickinson, 260, Swan Arcade, Bradford.

E. H. SAMS AND CO. (CARNO), LTD., 3, Victoria Street, Westminster, S.W.1. Manufacturers of manures, fertilisers and all kinds of chemicals, etc. Nominal capital, £1,000 in £1 shares.

SCALEX MANUFACTURING CO., LTD.—The Stores, Princes Road, Fremantle, Southampton. To acquire the business carried on by H. F. Warren, at Union Bank Buildings, 40 and 41, High Street, Southampton, as the "Scalex Co."; manufacturers of cleaning powders, varnishes, disinfectants, etc. Nominal capital, £3,000 in £1 shares.

SEMPROLIN CO., LTD., 18, Leather Lane, E.C.1. To acquire the trade marks and manufacturing rights in the chemical preparations known as "Semprolin," "Cermex," "Deterzene," and to carry on the business of chemists, druggists, chemical manufacturers and dealers, oil merchants, etc.

SENTINEL TRADING CO., LTD., 400, Sentinel House, Southampton Row, W.C.2. Oil and colour merchants, chemists and druggists, brewers, distillers, etc. Nominal capital, £1,000 in £1 shares.

STAUTONS (LONDON), LTD., British Columbia House, 1–3, Regent Street, S.W. Manufacturers of and dealers in colours, paints, varnishes, dyes, pigments, etc. Nominal capital, £5,000 in £1 shares.

VEL, LTD., Prospect Works, Cherry Tree, Blackburn, Manufacturers of and dealers in artificial manures; chemists, druggists, drysalters, etc. Nominal capital. £2,000 in £1 shares.

WELSH'S PRODUCTS, LTD., 34, Strand, W.C. Chemical manufacturers. Nominal capital, £100 in £1 shares.

Arcos, Ltd.

ARCOS, LTD., of Soviet House, 49, Moorgate, London, E.C.2, inform us that in their announcement in THE CHEMICAL AGE of October 28, reference was inadvertently made to the company's stocks of palm oil, whereas pine-oil was the commodity to which it was intended to draw attention.